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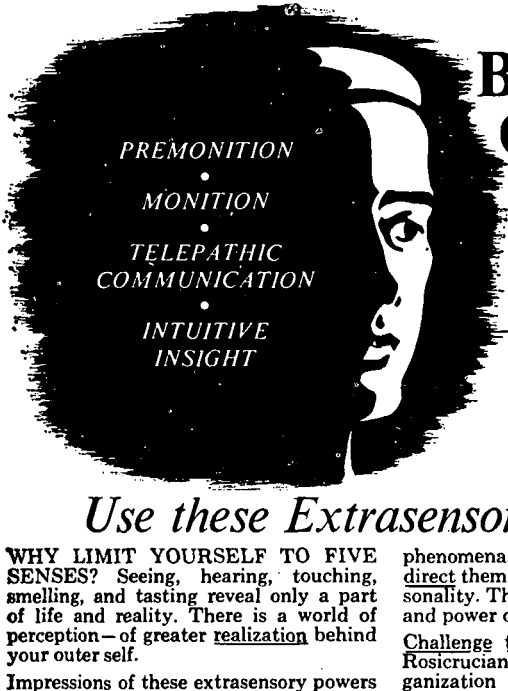

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THRILLING SCIENCE FICTION is published bi-monthly by Ultimate Publishing Co., Box 7, Oakland Garden, Flushing, N.Y. 11364 at $.75 a copy. Subscription rates: One year (6 issues) U.S. and possessions: $4.00 Canada and Pan American Union Countries: and all other countries: $4.50.

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By DANIEL F. GALOUYE

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MOUNTING the booming fury of the thunder, Zu-Bach's anxious voice bellowed from the forest:

"K'Tawa! Where are you? There's great danger!"

K'Tawa jolted from Meditative Withdrawal. Sighing, he shook his maned head in weary resignation. Always, for Zu-Bach, there was something compelling attention. But never was it Spiritual—only Material.

The Old One disengaged his lean limbs from the cramping convolutions of Cogitative Posture. Then, with a rasping intake of breath, he resumed respiration.

"K'Tawa, answer! Remember the Thing That Trapped? I've quazed more of them—in the Upper Endlessness!"

Zu-Bach's more specific identification of the danger impressed the Old One but negligibly. It only verified his suspicion that the other's concern was trivial, Materialistic.

But Zu-Bach was young. Why, his quazehorn was still puny in its immaturity. Many sleeps had yet to transpire, no doubt, before he would be ready to enter Phase One in his Ascetic Ascendancy. With that realization, K'Tawa felt more tolerably disposed toward his youthful kin. But being tolerant certainly didn't mean he would have to indulge the other's minor whims. The better course—much better—would be to remain quiet and hope that Zu-Bach would go away.

Which was what he seemed to be doing. At least, the sound of his thrashing about in the forest was growing more remote.

The Sorrowing Sea, restless with anger and racing before the lash of the wind, was hurling itself against the rock upon which the Old One sat. While he had Meditated, warm rain had plastered his beard against his chest. Above, the Perpetual Clouds writhed as they roared at one another and hurled fierce bolts down upon the inland forest.

Things That Trapped, in the Upper Endlessnes—indeed! K'Tawa smiled at his young kin's imagination. But, just to be sure, he quazed up into the Clouds. There was nothing there, of course.

Yet, there was some hope for Zu-Bach. For, at least, his interest *did* extend in an encouraging direction. Throughout the First Phase of Ascendancy he would have to concern himself solely with the Upper Endlesness.

The Old One folded his arms, drew in a final breath and, thanks to the suggestive effects of Zu-Bach's words, was soon pondering the Dichotomy of Endlessnesses.

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OF things without limit there were but two—the Upper and Lower. The former, of course, could be dismissed with a meditative flick of the wrist. Above the clear air there were Clouds, and Clouds, and Clouds —as far as one chose to conceive. The Lower Endlessness, on the other hand, was an infinite downward continuity of stone-impregnated mud and water—little of the former, but much of the latter. And between the Endlessnesses—

"K'Tawa! K'Tawa!"

He wrapped himself resolutely in his thoughts. Between the Endlessnesses, he resumed annoyed, was the Day—the Eternal Day. Then he puzzled over his conceptual concoction: an Eternal Day squeezed in between two Endlessnesses. Why an *Eternal* Day? Did that suggest there might somewhere, somehow be *another kind* of Day?

Troubled, he tried to envision a non-Eternal Day. Without luck, he cast about for a rational concept that would embrace a non-Day, or even an un-Day. But it was all beyond grasp. Moreover, not even in all the ancestral memory at his disposal, as far back as he could reach from the vantage point of Phase Seven, was there anything relevant to the enigma he had posed for himself.

"*There* you are, K'Tawa! Wake up!"

The Old One shook off the grip of strong hands on his shoulders and sprang to his feet.

"Never," he rebuked, "never arouse anyone from Meditation in the Upper Phases! It might be fatal!"

The rain had stopped. But its final drops were clinging to the incipient quazehorn that rose from Zu-Bach's matted white hair.

"There are many Presences in the Upper Endlessness!" he announced. "I counted them. Forty small ones and one large one!"

"Where are they now? *I* don't quaze them."

Zu-Bach pointed off to where the Sorrowing Sea met the Perpetual Clouds. "They're gone—into the Horizontal Endlessness."

K'Tawa dug a finger into his beard and scratched his chin. The *Horizontal* Endlessness—hm-m-m. Interesting concept. At least the boy did appear to have a *worthwhile* imagination. "About your Ascetic Ascendancy—have you decided—"

"The Presences, K'Tawa!" Zu-Bach seized his shoulders again. "What about the Presences?"

"You said they were gone."

"But they'll be back! They went straight that way." He pointed with his spear. "They

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won't turn. But soon they'll reappear—from *that* direction." He indicated the opposite horizon.

The Old One laughed. "With Endlessnesses in all direction, how can they come back without turning?"

Zu-Bach spat in the sea. "They *did*—four times since I started looking for you."

THE Old One, without realizing it, had closed his eyes and opened his mind to the intriguing possibilities of a Horizontal Endlessness and Presences that could go off in one direction and return from another. If that concept were valid, he reasoned, then one was to believe that Endlessnesses might be bent back upon themselves. Which meant that—

"K'Tawa!" the other shouted. "The Presences are *dangerous!* I quazed that much. They're just like the Thing That Trapped. Remember?"

Indeed he did remember. But the Old One had never quite believed that preposterous account. Oh, he could quaze that Zu-Bach had encountered *something*. But the encounter may well have been with nothing more real than his prolific imagination.

"I wouldn't worry," he advised. "If they are Presences up there and if they *are* menacing, we can at least be thankful they're not down here."

"But the Thing That Trapped was up there before it came down!"

K'Tawa was becoming quite impatient. His thoughts were at a most productive peak at the moment. And he should be directing all their energy into the Spiritual Development of Phase Seven, into his Search for Origin and Meaning, his Total Communion with the Fundamental Endlessnesses. But this non-Ascetic, this Prephase supplier of food was seemingly intent upon complicating his Withdrawal from the Material.

"What do you want me to do?" he asked finally.

"Help me quaze them next time they go by. If they *are* like the Thing That Trapped, we'll warn the village."

K'Tawa drew back. Warn the village indeed! And jar scores of Meditators from their Pursuit of the Spiritual Significances? What insolence!

Lowering himself on his haunches, the Old One said, "I must ponder it a moment."

AFTER attaining the Upper Phases, one never lied. And the fact of the matter was that K'Tawa *had* intended to explore the feasibility of disturbing the Ascetics. But hardly had he seated himself when he found

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his thoughts drifting to the concept of an Endlessness folded back upon itself.

How fascinating! For instance, one might imagine a trip (by tunnel or cavernlike passage) through the Lower Endlessness, only to find himself breaking through another surface and gazing overhead at the same Upper Endlessness!

No. It wouldn't be *another* surface. It would be the *same one* bent back upon itself—just like the outside of the clayballs he used to play with in his pre-Prephase days!

It was astonishing. Yet—*it was true!* From a thousand sources now, all buried deep in ancestral memory, came irrefutable verification.

A Lower Endlessness complete within itself and limited by its surface—its unbroken, spherical surface!

He leaped up, shouting exultantly. There was no doubt about it—he was mastering Phase Seven! No one else before him had done it. Could he dare hope to push on perhaps to an *Eighth* Spiritual Level?

Zu-Bach, he was aware, was only staring uncertainly at him. "The Presences," he asked. "What about the Presences?"

K'Tawa glowered—then restrained himself with the realization that Kinship must be respected, even the most distant. How else could anyone hope for Total Communion? "What Presences?"

"There!" the other shouted, pointing his spear toward the Clouds. "Those!"

The Old One tilted his horn in the indicated direction. There were Presences, all right. Many small ones, all in a line—followed by one huge something that seemed to defy quazing. And he puzzled over the fact that the invisible things, too far away to be seen even if there were no Perpetual Clouds, were traveling incredibly fast. Yet they *appeared* to be moving extremely slow.

He quazed strength and power, hardness and intricate design and durability—purpose and determination.

Many Presences from a distant—a distant what? K'Tawa couldn't quaze the concept. It was too alien, too awful.

* * *

LEANING forward in his inertial couch, Colonel Scott O'Brien squinted through the forward port at the logistic train as it orbited ahead of the Argo into blazing sunrise.

One by one, the supply capsules—the resurrected Mercuries, modified Geminis, converted Apollos—streaked from the obscurity of night and flashed into scintillating brilliance. For-

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ty vivid diamonds in a sparkling tiara around the cloud-veiled head of Venus.

O'Brien, alert and lean, sagged back in the couch and shifted his attention to the microwave radiometer screen. The Van Horstein scanner was penetrating both the ionosphere and the cloud layer at full gain, etching the grid with fine detail.

Venus' solitary strip of land, almost two thousand miles long but only a tenth as wide, snaked across the scope. He adjusted the transverse reference control and watched the red line leap into luminescence on the screen.

"TR locked in phase," he called out to Commander Green in the adjacent couch. "We'll hit the sequencer in fifteen seconds."

Green's characteristic grin was rampant on his blunt face now that the two hundred million-mile journey was at end. "Ready on the SQB."

O'Brien stared at the grid until the red line drifted to the central crosshairs, carrying with it the surface features it was tracking. "Mark!" he shouted

"Mark," Green echoed. "Phased landing sequencer set for Recovery Area, Southwest Quadrant. Countdown under way. Ten minutes to Zero. Everything positive."

After an impatient moment, O'Brien prompted, "Wastrom?"

There was no answer from the couch directly behind him.

Green leaned over. "He's probably praying again. Somebody sure slipped up when they psyched *him* out for this junket."

The Colonel reared back. *"Wastrom!"*

There was abrupt movement aft. "Yes?"

"The train—how about it?"

"Oh. Retro systems positive."

"All forty?"

"I don't see any red lights."

"How about the 'chute packs?"

"All green. Everything's ready. Think we'll make it okay?"

O'Brien didn't answer. He was tired of reassuring the electronicist. What made the situation all the more ridiculous was the fact that Wastrom, youngest of the four-man crew, was also the most rugged and competent-looking. But it was clear now that he had left most of his guts somewhere between Earth and Venus.

"Nine-thirty and counting," Green announced.

And a vigilant voice responded from the right rear couch, "All Argo systems positive."

O'Brien glanced back and nodded in unconscious approval of the contrast between Frank Yardley and the other civilian

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member of the crew. As the Argo's nuclear technician, Yardley was almost 15 years Wastrom's senior and, seemingly, half the latter's size. But O'Brien wouldn't have swapped half a Yardley for all the Wastroms he could find.

"NINE minutes to Zero," Green said.

O'Brien watched Yardley's hand dart to a toggle switch. A shudder ran through the ship as coupling bolts exploded.

"Capella stage separated," the nuclear tech said.

Colonel O'Brien relaxed, passing a hand back over the bristles of his closely-cropped, blond hair. That left the Argo clean for entry. All that remained now of what had once been a massive configuration was the III-D 'chute assembly, Jason capsule, *Procyon* IV-B solid fuel stage for blastoff and the Spica fin-and-retro pack. One hundred and fifty-five feet of precision engineering and intricate instrumentation that would soon be plunging planetward. Meanwhile, the Capella II, with its oxygen difluoride-diobrane fuel load, would be dutifully waiting for orbital reunion.

Commander Green's voice broke the silence. "Eight-ten and counting. Ready, Scott?"

"Ready." O'Brien reached for the attitude sequencer lever.

Green intoned, "Eight even."

Throwing the control, O'Brien settled back while the ship lazied about. The forty supply caps, all arow and aglitter against the fiercely white cloud mantle, drifted from view as the Argo turned her back on them and steadied in braking attitude.

"You—you suppose it's hot down there?" Wastrom asked.

O'Brien concealed his annoyance. "A dozen fly-by probes showed that the 'severe heat' isn't connected with the surface at all."

"The preprobe boys were led astray by a high electron-density in the ionosphere," Yardley added. "Our soft-landed probes proved it rarely gets over a hundred planetside."

"But how can we be sure?" Wastrom demanded.

"Well, it goes like this," Green offered without the trace of a smile. "The last instrumented probe broke an egg on a Venusian sidewalk. It didn't fry. Seven minutes. All systems positive at Post One."

O'Brien adjusted the phased entry system oscillator and coaxed out a higher-pitched whine. If Wastrom was prepared to trot out his fear that the soft-landed probes had not detected lurking, hostile life forms, he might decide on complaining about his eardrums instead.

Thus far, it had been a re-

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markably uncomplicated trip. And O'Brien could only hope the two other deep-space trains following at one-week intervals would have it half as good. They probably would—if they had no Wastroms aboard.

In all, it was a fairly impressive effort—as well it should be, what with a price tag of forty billion. But you didn't quibble about costs when the Reds, in effect, held the moon as a protectorate with the sanction of every noncommitted—and trembling—nation on Earth.

A score of lunar bases, all secretly armed but with the Kremlin "guaranteeing" their military neutrality (without inspection, of course), comprised a formidable ace-in-the-hole and an insurmountable diplomatic club. Earthside armament systems neutralized each other. But the Soviet lunar development, begun five years before the U.S. had acquired the capability of landing a man on the moon, was the margin of difference.

Unless Uncle balanced the scale by developing his own reserve extraterrestrial backstop, he might as well dig his hole.

O'Brien shrugged unconsciously. So Venus gets tabbed and trains of supplies and personnel, followed by a caboose of interplanetary armament, are in deep space in a one-shot arsenal-building project.

WHAT if there's life down there?" Wastrom's voice quaked above the oscillator's whine. "Hostile life, I mean. Intelligent enough to stay away from scanners."

Before O'Brien could dig up one of his well-worn rejoinders, Commander Green declared, "Three minutes, thirty seconds to Zero."

"I said," Wastrom persisted, straining forward, "what if there's hostile life? The scanners spotted only two four-legged things and one small biped—nothing else. Where're the lesser forms? What if—"

"Three minutes, thirty seconds!" Green repeated irately. "That was *your* cue, Wastrom!"

Pulling against his harness, the Commander leaned back toward Wastrom's couch. His hand darted between tubular braces and flicked a switch on the electronicist's console.

There was another shudder of distant concussion and Green said, "ComPac ejected."

"Sorry," Wastrom offered.

O'Brien checked the separation on his scope. The orbital radio relay station, a bright blip close to the center of the screen, was pulling away steadily. With its signal-sensing antennae, it would be a necessary link in Earthside-Venus Base communications.

Still scowling, Green removed

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his earphone. "ComPac signal strong and clear." Somewhat more softly, but still loud enough for the Colonel to hear, he added, "They'll know we got this far at least."

O'Brien chuckled. "Oh, we'll get you back safely to the wife and kids."

Wastrom raised a hand. "I *said* I was sorry."

Two action-filled minutes of final checkoff operations passed in silence as the Colonel sketched his imaginary diagram of an entry trajectory for the Argo that would plop it down in the center of the target, with forty supply caps spaced at half-mile intervals westward through the Recovery Area.

Then Green warned, "Ten seconds to Entry Zero."

At the count of five, O'Brien punched in the stud to activate the landing sequencer.

Now there was nothing to do but hang on and wait.

II

GRUDGINGLY, K'Tawa followed his young kin back toward the village. This imposition on his Contemplation was most inconsiderate. But there was little he could do except respect Zu-Bach's urgent plea. The Code of Kinship required no less.

Still, his own interests were impelling at the moment. So he compromised. With eyelids lowered in Visual Withdrawal, he relied on the perceptual faculty of his quazehorn to guide his footsteps through the forest. Meanwhile, he consigned full Meditative attention to his Seventh-Phase pursuits.

Progressive Ascendancy came quickly, encouraging the hope that his recent results had not been spurious. There was, for instance, a remote forebear (whose name appeared to have been something like "Y-Lem-'Ah") who had managed to pass on to ancestral memory-searchers of the future a vivid impression of his features. He had done that by spending endless periods gazing into the shining surfaces of ancient objects his people had found on their tiny—"island"?

Then K'Tawa's brow wrinkled, even despite his semi-Withdrawal. Y-Lem'Ah had had *no* quazehorn—none whatsoever! Nor had any of his people—at least not until the time their "island" had sunk in a Minor Debacle and he and some of his kin had floated on rafts to Onlyland.

The recollection faded and K'Tawa was left with a hollow, searching loneliness. Yet he was exuberant in his accomplishment. Nobody had yet reached back to the time when Onlyland

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had evidently been "Mainland"!

Up ahead, Zu-Bach paused and waited. "You'll tell the Meditators how important the Presences are? They respect *your* opinion."

"Why shouldn't they? Am I not the most advanced Contemplator?"

"Then you will help me convince them?"

"I can do no more than attest to the presence of the Presences."

"But they'll be able to quaze as much for themselves!"

"Of course they will. And what you should be concerned over is the possibility that they'll also quaze your obstinate rejection of Spiritual Ascendancy."

Suddenly intolerant, Zu-Bach turned and stomped ahead. The Old One followed, resenting the demanding Responsibility of Kinship.

The village was a confusion of stone-thatch huts that grew from the soft mud and, like a mangy nakedness, laid bare in its spot the rain-washed sweep of forest.

K'Tawa, with Zu-Bach beside him, paused at the edge of the clearing and watched the Pre-Meditation Ceremony of the Summoning of the Hot Tongues.

Exemplar L'Jork stood solemnly before the Drying Hut, elevating to the Upper Endlessness a bundle of crisp leaves. His ample quazehorn was rigid in its upthrust orientation with the Perpetual Clouds. His drawn face, lined with the humbling evidence of self-sacrifice and frustrated Spiritual ambition, was both sober and serene. K'Tawa recognized the inappropriateness of the title Exemplar. But it wasn't because of any shortcoming on L'Jork's part. Rather, the demands of leadership in the provision of communal necessities severely limited his own Ascetic Ascendancy—to the extent that he had never progressed beyond Fourth-Phase Contemplation.

THE exemplar came forward and the other Meditators closed ranks behind him. He placed the leaves on the Central Slab and knelt before taking up the Starting Stones. Then, with all the others crowding around and blowing rapidly at the leaves, he began striking the rocks together.

Soon the first Hot Tongues materialized and the Meditators blew even more eagerly. Additional Hot Tongues appeared among the leaves and the dark Vaporous Offerings began lifting itself gracefully to join the Perpetual Clouds.

Unable to constrain himself any longer, Zu-Bach surged forward.

"Meditators!" he shouted,

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waving his spear. "Your attention!"

Exemplar L'Jork glanced up and scowled. The Elder Contemplators broke their compact circle around the Slab and faced the source of disrespectful interruption. With a final issue of Vaporous Offering, the Hot Tongues vanished from the leaves.

Behind his young kin's back, K'Tawa spread his hands apologetically. "Your indulgence, Exemplar. Zu-Bach would be heard."

"In view of your sponsorship," L'Jork said solemnly, "we shall hear him then."

With another helpless gesture, K'Tawa signified that he was, as yet, certifying nothing.

Several women poked their heads out of the huts to see what was going on. One, departing with her yet unborn child for the Retreat for Delivery and Training, paused curiously.

"We have quazed forty-one Presences in the Upper Endlessness!" Zu-Bach blurted out. "*Evil* Presences! And they will come down!"

L'Jork glanced at K'Tawa and the Old One nodded confirmation.

Several of the Elders, disinterested and intent on getting started with their Meditation, began drifting off. After all, the Materialistic was Zu-Bach's responsibility, not theirs.

"But this is important!" K'Tawa's young relative pleaded. "They may turn out to be Things That Trap!"

L'Jork regarded the Old One for further verification.

"I didn't quaze *that* likelihood," K'Tawa said. "But if they are, as Zu-Bach says, Things That Trap, I should imagine all we would have to do is stay out of *their* way."

The Exemplar thoughtfully combed his beard with long, curving fingernails. "This Thing That Trapped—what was it like?"

"It was broad and round at the bottom and narrow and round at the top—all shining and hard, determined and cunning." Zu-Bach directed his words at the remaining Elders, who even now were beginning to turn their backs. "I found it on the beach and watched it through many periods."

Only L'Jork and K'Tawa remained to listen—the former but perfunctorily; the latter, dutifully. All the Elders had seated themselves on their individual Thinking Slabs in front of their huts and had assumed Cogitative Posture, heads bowed under the weight of burdensome quazehorns.

NEVERTHELESS, Zu-Bach went on, addressing his appeal directly to the Exemplar.

(Cont. on page 172)

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THE LUNATIC PLANET

By RALPH BURKE

It has been said that only a thin line separates genius and insanity, and the idiot must certainly regard the genius as a madman. But perhaps this point is of no great importance when we consider the opposite: What does the genius really think of the idiot?

THE Terran Colony on Chiron was going to be just what Dane Chandler wanted. He sensed it the instant he stepped off the interstellar liner and set foot on Procyon's fourth planet.

With surprise he noted that the colony was not at all the primitive outpost he had feared it would be; it was a bustling active little globe. That pleased him. Chandler had come to Chiron hoping to find a small, tight group of colonists in which he could create a niche and where he could feel he really belonged.

He paused uncertainly at the edge of town, watching the busy workers, the hurrying farmers and builders. He sensed a sudden, youthful exuberance, as he drew from all this activity, a feeling of growth and expansion of which he could be a part. A sort of joy arose in him, a warmth.

But it was a joy he had felt before. And going to space had not been the solution then.

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The screaming native collapsed under the splintering blow.

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or leaving space to return to Terra.

When the liner had blasted off—Chiron was just an insignificant stop on a route which covered a dozen stars—Chandler turned to study the three other prospective colonists who had made the voyage from Terra with him. There was a pretty girl, impatient to join her farmer-husband on the new planet; a short, stocky farmer; a nondescript spacefarer, one of the many who drifted the spacelanes from planet to planet. All three had approached Chandler on the ship when they learned that he, too, was going to Chiron, but Chandler had not been friendly with any of them.

Hornaday, the farmer, turned to Chandler and said proudly, "I'm expecting my brother to meet me at the depot. He's been living on Chiron for five years."

"Really?" said Chandler, looking at the golden-green sky.

"Used to write me about how wonderful and new everything is here. Kept telling me, so I decided to come. We've both been saving for two years for my passage—we did not even write to each other, to save on postage."

"Yes," said Chandler. He had put a year of his space pension into his passage-fee. He took a deep breath. The air smelled good. Chandler realized with a shock that this was probably the first time in his life that really fresh air had ever entered his lungs. First there had been the soup that passed for air on Terra, and then, through the long years in space, the purified but subtly stale air of spaceships. And then, when loneliness had finally driven him from space, the air of Terra again. But here the air was fresh and good.

A short, heavily-tanned, wind-creased man approached the little group of new arrivals. Chandler scanned the newcomer's face and saw that beneath the scars of the elements he bore the same good-natured simple face that belonged to the farmer on his right. The newcomer must be Hornaday's brother, Chandler thought. He was right.

The two men embraced unashamedly. Hornaday picked up his little bag of belongings and, talking excitedly, followed his brother off into the town.

Chandler watched them disappear into the heart of the colony, staring at the two

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broad backs side by side. In a few weeks Hornaday would blend with the other colonists. His Terran background would melt and trickle away, and he would be working side by side as a member of the colony. Chandler envied him.

A white-haired colonist, tall and straight and smiling, appeared abruptly at Chandler's elbow. "I'm Kennedy," he said. "You're Dane Chandler?"

Chandler glanced at the other, surprised. "Yes," he said. "Are you the man who's supposed to meet me?"

"That's right. Glad to see you, Chandler. We can use men like you here on Chiron. Come on—I'll show you where you're going to stay."

Kennedy began to walk off in the direction the Hornadays had taken, and Chandler followed him.

"I'm relocation director, among my other jobs," Kennedy explained. "It's my duty to see that all the new arrivals get satisfactorily settled and orientated. Since you don't know anyone on Chiron yet, I've taken the liberty of assigning you a roommate. He's Jeff Burkhart, one of our earliest colonists—came here on the second ship, back in '16—and I think he'll be able to help you get acquainted with the set-up here."

They turned down a long, straight street with small houses on either side of a well-paved road. The street was studded with twisted, red-leaved miniature trees.

"You're a former spaceman, aren't you?"

"That's what my application said. I got tired of the life after a while and quit. I thought space would be the life for me—I don't mind being by myself sometimes—but I couldn't take the emptiness, the loneliness—"

"I know," Kennedy said. "I used to do the Jupiter run."

"You know, then. Two years ago I pensioned out and went back to Terra to settle down."

"You didn't stay on Terra very long," Kennedy observed.

"They didn't want me, and I didn't want them. It worked out very nicely. No one was interested in a spaceman who had spent half his life out of the main stream of things. And it was like living in a beehive, staying on Earth. Twenty million people in this city, thirty million in that one, and I think I knew four people altogether by name. It was worse living in a city of strangers than in space. So I came here. New, small colony. I want to find a place where I belong."

"I see," Kennedy said.

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Dane Chandler hoped he had.

"Burkhart's a good man for you," Kennedy went on. "He's a solid individual. One of our best men."

"I'd like to get to meet him," Chandler said. "Hey—what's that?"

A preposterously tall, chalk-white humanoid alien with long clawlike hands and an appearance of great fragility was coming up the street toward him, laughing and crying all at once. When he saw Chandler he clapped his hands and gave a wild roar of laughter, then dashed onward down the street.

"That's one of the natives—the Chirenes."

"Is it drunk, or just plain silly?"

"That native is as sober as you are," Kennedy said, frowning. "He's insane, that's all. They're all like that. It's a planet of total lunatics."

Chandler racked his memory for some fact he might have learned about the natives of Chiron. But there were so many worlds, so many sorts of aliens—he gave up.

"Lunatics? How come?"

"No one knows. They were living a sort of nomadic existence when we got here, and some of them decided to hang around the colony. The rest vanished somewhere as soon as they spotted us. We've never been able to find them."

Finally they stopped walking, and Kennedy indicated a trim three-room house. "I've assigned you this one. I think you'll like it, and Burkhart ought to be able to handle any questions you may have. Or you can come see me if there's trouble. Everyone knows where I live—just ask anyone."

They entered the house. Burkhart was stretched out on a comfortable-looking foamite sofa, reading. He snapped off the projector and rose to greet Chandler.

"I'm Jeff Burkhart," he said warmly. "You're Dane Chandler, right?"

Chandler nodded. Burkhart was almost as tall as he was—nearly two meters—and had obviously been a powerful man in his youth. Some of his muscle had turned to fat, but he still seemed to be in good shape. He looked to be about sixty, Chandler decided, noting that Burkhart's hair was prematurely gray.

"Glad to meet you, Chandler. Welcome to Chiron, and all such sentiments. Kennedy's probably welcomed the devil out of you by this time. He's good at it."

"I'll let you two get ac-

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quainted," Kennedy said, and left, smiling.

With formalities over, the two men confronted each other almost icily for a moment. Chandler determined not to reveal anything until Burkhart did. At last the older man flung himself loosely on the couch.

"You know anyone in the colony, Dane? Got any friends here, I mean?"

"Not a one," Chandler said. "I can't recall having very many friends anywhere, to speak of."

Burkhart smiled faintly, and Chandler realized that he appeared to be inviting pity.

"I don't mean it that way," he snapped. "It's just that I never found time to make friends. I was always alone in space except when I was on Terra, and you know what Terra's like."

"Seven billion people on a planet fit for three. Sure, I know. But we've only got a few thousand here."

"What kind of work do you do?" Burkhart asked. "I'm one of the hiring organizers here."

"I'll start off building, I think. I want to know I've had a hand in building Chiron." He leaned back, stretched out, and did his best to summon an enthusiastic smile.

Burkhart found him a job in a construction project, and Chandler tried conscientiously to become friendly with the men he worked with, but it was no good. The same thing which had driven Dane Chandler into space at the beginning—the feeling that there was a wall between him and the rest of the world—kept him from really getting to know anyone on this new planet. Even Burkhart remarked openly about it.

"I can't figure you out," he said one night at the Entertainment Casino. "I've lived with you three weeks and you are still almost a stranger."

Chandler sipped his drink and said nothing.

"For instance," Burkhart went on, "you went to space. You never really told me why you quit, or where you served. You were lonely, you said, but that's pretty vague. How lonely? Didn't you stop at ports long enough for women to—?"

"Lay off," Chandler said.

Burkhart ordered another drink. "No. I think it's important. Why'd you leave space, really?"

"Space fatigue," Chandler said. "Too many solo trips."

"I see," Burkhart said. "You may think I'm prying—"

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"I do."

"I'm just trying to help you."

"Thanks," Chandler said. He gulped the drink and leaned back in his chair. The Casino was filled with laughing colonists, and weaving through the gay crowd like white threads through black were a few of the natives, bizarrely dressed and wild-looking.

"Why don't you ever visit some of the men you work with, Dane?" Burkhart prodded. "I'll bet you don't even know all their names. Do you?"

Suddenly Chandler hated Burkhart.

"There. I'm right. They're just faces to you, instead of people. I think that's your trouble: you've been away from people so much you don't know what they are. If you weren't so wrapped up in yourself all the time, you'd—" Burkhart broke off suddenly. "Watch out, you clumsy idiot!"

A native had come by, and, flailing his arms aimlessly in the air, had knocked Burkhart's drink all over his lap. Infuriated, Burkhart rose and in one swift motion knocked the tall, elongated alien to the floor. Instantly the sound of laughter died away in the Casino and a hundred pairs of eyes turned to watch.

"You idiots have been in my hair long enough," Burkhart shouted vehemently. "Why don't you learn to stay away from us?" He stared down at the Chirene who lay on the floor, his pale tongue licking in and out of his mouth.

Chandler sensed that Burkhart's rage was mounting within him, and he stood up next to the older man in an attempt at heading off the explosion.

"Sit down, Jeff. The poor animal didn't mean to knock your drink over, after all."

"Shut up," Burkhart said. "This isn't the first time they have done that." He scooped up the alien, holding him by the bunched-up front of his robe. The Chirene's head towered almost a foot over Burkhart's. "You've been going out of your way to bother me, haven't you?" Burkhart demanded.

"Let go of him, Jeff," Chandler said.

"I'll let go of him, all right!" He flung the alien across the room; he crashed into a table and collapsed in a heap, while glass cascaded down, broke, and tinkled.

Chandler drew back his arm and hit Burkhart in the face,

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hard. Burkhart sank softly into his seat. A trickle of blood began to wind from the corner of his mouth.

Thank you, someone said.

"You're welcome," Chandler replied automatically.

Then he realized that no voice had broken the stillness that pervaded the Casino.

Thank you. For once someone has defended us from him.

Chandler slowly turned, understanding who had spoken, and looked inquiringly at the grotesque alien. The alien returned his glance, and calmly nodded.

"It *was* telepathy, wasn't it?" Chandler asked after he had finally gotten the cadaver-like alien back to his room and dropped him on the couch. Burkhart had watched coldly as Chandler picked up the Chirene and dragged him out, but had made no move.

The alien's name was Oran, and he was half drunk and half insane. He drooled and laughed and cried and cursed, but gradually began to calm down.

Yes, it was telepathy, said a quiet voice in Chandler's mind.

"I was right," Chandler said.

The alien laughed. Chandler studied him carefully—an absurd, clownlike figure, almost seven feet tall, stretched out at full length, slowly twitching first one limb and then another.

"Your people regard mine as insane," the alien said aloud, slowly. "But *you* are the insane ones. Your people have destroyed ours," he said tonelessly.

"What's that?"

"There are always such undercurrents of hate flowing from your minds. Our only fault was that we could see into them."

The alien closed his eyes and curled up into a fetal ball. Chandler waited patiently, and at last he uncurled.

"I haven't been this coherent in years," the Chirene remarked. "My people—why do you radiate all this curiosity? —my people lived here before yours came to colonize. We never needed to speak out loud —always in the mind, as I did to thank you. Then you came and destroyed us. We looked into your minds—we couldn't help it—and our minds were blasted by the horror and hatred we saw in yours. We went insane."

Chandler sat down heavily. The Chirene struggled to his feet and tried feebly to leave, but Chandler concentrated on controlling the alien mentally,

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and succeeded. He subsided.

"You're the first who knows we have the *sorn* sense. We lived in the closest mental rapport, sharing every thought and every emotion. And the first Terrans landed and came forward to greet us, and we extended our minds to them as is our custom, and we looked in, and the pit of filth that lay at the bottom of their minds swept us down. But I'm talking too much. Let me go, please."

The alien pulled himself to a sitting position again.

Wait, Oran, Chandler ordered.

"You're too strong for me," the alien said. "I feel the pressure of your mind on mine, and I'm not strong enough to resist. You Terrans are all alike."

"Is this true—about what happened to your people?"

"I'm not a Terran, Chandler. I can tell only truth."

"Were they all—all of them destroyed?"

Oran hesitated. "Were they?" Chandler repeated.

"No," Oran said. "Some fled to the desert and hid there. No Terran will ever find out where."

Suddenly the alien paled almost to a bright white. Chandler realized that the Chirene had picked up his thought even before he had let it rise from his subconscious.

No. I won't take you there. I can't!

Oran turned away and began to sob convulsively. Chandler wandered up and down the room, while the picture slowly began to form in his mind—the picture he knew the alien must have constructed long before it had shaken into place in the cruder mind of the Terran.

Point one: telepathy existed.

Point two: the aliens were unable to bear the proximity of presumably filth-ridden Terran minds.

Point three: a telepathic Dane Chandler would be one who at last would be no longer isolated from his fellow men.

Point four: if—

I wish you had let me lie on the Casino floor. Yes, your guess is right. Telepathy can be induced in humans.

Chandler paused and stood still as the alien's mind crackled out the thought. The final piece of the jigsaw puzzle clicked neatly into place and he turned to face the sobbing, miserable Chirene.

You'll take me to the hidden Chirenes, Oran, Chandler's mind said. It was Chandler's most powerful need, the need

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to associate and blend with other men, the one factor that had always been missing from his personal equation. Now the solution was in his grasp. Relentlessly he let his mind pound against the helpless, already-weakened mind of the alien. *You'll take me there, Oran.*

It was a command rather than a question.

After a long silence Oran answered, out loud. "You Terrans never satisfy yourselves. You've destroyed a wonderful civilization and now you're going for the remnant of it. All right. I can't defend against your mind. I'll lead you to my people. You've made me sell out my race. All right, Chandler; get your things together and let's go—*Terran!*"

The last word was an explosive spitting thought that ripped into Chandler's brain. He looked grimly at Oran, and tried to let his mind beg forgiveness.

The Chironian desert was wide and flat, with clumps of thick vegetation holding down the sand dunes. Oran set a merciless pace through the yellow sands, and Chandler followed, not speaking and trying not to think. The tall figure of the alien bobbed constantly in front of him. Chandler winced at the realization that he was grinding the last speck of self-respect out of the Chirene, but he saw himself approaching the end of a weary quest.

For as far as he could see, there was desert. It looked the same all around, except for the dark patch far behind him which marked the end of the desert and the beginning of the verdant land where the Terran colony was situated.

As dusk began to settle and the strange purple Chironian twilight covered the land, Chandler realized that the alien could very easily be leading him in circles, waiting for his food to run out.

"Are we heading in the right direction, Oran?" he asked, breaking a silence that had endured for almost twelve hours.

The stinging response came: *Am I a Terran?*

Stung by the rebuke, Chandler looked away and began silently to make camp for the evening. They settled and awaited the night.

Chandler lay awake for hours, dreaming of the hidden city that was somewhere ahead, and planning. Oran, next to him, seemed to be in deep slumber.

Finally, Chandler dozed off. After what semeed like hardly

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any elapsed time, he awoke brusquely to the sound of wild laughter.

He needed a moment to adjust to wakefulness. Then he peered into the darkness and saw the figure of Oran, dashing off through the Chironian night.

Oran, he telepathed desperately. *Come back!*

But the alien kept running. Chandler watched him go, helplessly. There was no use trying to pursue the long-legged alien.

I cannot face my people. The sudden thought reached Chandler like a cry drifting on the winds. Oran continued running until he faded from sight as if hidden behind a curtain of black. Chandler stood staring into the night for a while, and then sat down on the shifting sand and awaited the coming of dawn.

When Procyon rose to bring morning, Chandler surveyed the situation. Somewhere ahead of him was the hidden city of the Chirenes. Behind him was the Terran colony. He would have to take his chances with the desert, he decided, and keep going.

He headed through the trackless sands, mind fixed firmly on the unknown destination ahead. The sun rose higher and higher in the sky, and he cursed Oran more and more as it grew hotter. Frequently he turned to make sure the Terran colony still lay behind him. It would never do to wander for days only to blunder foolishly back to the colony without having found anything.

A great green bird leaped from the clinging shubbery as he tramped through it, and, uttering angry squawks, headed for the sun. Chandler continued through the long afternoon, stopping occasionally to empty the gritty sand from his boots.

For the hundredth time he checked the colony, now just a speck on the horizon. Then he moved forward. The sun was oppressively hot now, and sweat was trickling down his back. There was nothing in sight but rolling dunes and low shrubs. The silence roared in his ears.

Chandler began to feel that Oran had tricked him after all and left him to die in the desert. But there could be no turning back now. He moved ahead.

Go no further. Halt and return.

The thought struck him in the forehead and held him for a moment, and the suddenness of it brought a flash of fear

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racing down the back of his legs.

"Who said that?" he asked aloud.

Then he passed a hand across his eyes to clear away the sweat, and silently answer his own question.

Don't go any further, Dane Chandler. We cannot bear your presence.

"Who are you?" said Chandler.

You needn't pretend, Chandler. You know who we are. We have watched you closely since you first encountered Oran.

"You know what I want, don't you?"

The sorn sense is not for Terrans, Chandler. Go back and let us mourn alone.

"I'll decide that," Chandler said. He took a tentative step forward. There was no resistance. The ghost of a suspicion wandered through his mind.

Yes, came the confirmation. *We cannot prevent you from approaching. We ask you—as between civilized beings—to go back and not expose us to your mind.*

Chandler kept moving, placing one foot carefully in front of the other. He could feel the mental voice of the aliens growing desperate.

"You know what I want," he repeated.

Do you really want telepathy, Chandler? Do you really want to be able to look at the minds of your brothers? We have already seen them. We know what lies beneath their surfaces.

Chandler stared at the bright glinting of the sun on the hot sands. "Yes. I want it. And I'll leave you in peace if you'll give it to me."

He took another step forward.

We have no choice, said the silent voice, and there was a note of pain in it. *We cannot bear the nearness of your mind any longer. We will show you how to realize your latent extra-sensory powers, and then leave us.*

Chandler quivered. "I'm ready," he said.

Open your mind to us.

Chandler relaxed, closing his eyes, and let their minds flow through his, feeling them rising and swelling in a celestial symphony in perfect harmony. Their minds bathed his, explored his, beat upon his. He sank to his knees in the sand.

Suddenly perception burst upon him as if an explosion had blasted away scales from his eyes. Their minds were open to his.

It was one great mind composed of individual members;

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blending and merging to form a unity. A sense of being in the presence of a divinity washed over him and left him breathless.

Then it was over. As suddenly as it had begun, it ended. Their minds closed to him. The weight of that rejection bowed him lower in the sand.

Go. We have kept our word. Go back and look at your brothers.

"Can't I stay here with you?" Chandler finally asked.

It would destroy us. You have what you want. Go.

He nodded to the invisible aliens somewhere before him in the desert. The thought of the colony and all its people came to him.

"Right. I'll go."

His head throbbed and pounded as he about-faced. The speck that was the Terran colony was hidden by the afternoon shadows, but he felt the presence of Terran minds in the distance, and he set out across the desert to reach them, to join them, to offer them the gift he bore.

As he approached the colony a vague uneasiness began to wander through his mind, growing slowly until it became a definite feeling of fear. The colony loomed up before him and he strode toward it, wondering who he would encounter first.

It was Kennedy. The white-haired relocation director smiled and waved when he saw him. Chandler held his powers in check as best he could, waiting for the moment to let them free.

"I've been looking for you, Dane," Kennedy said. "Jeff Burkhart told me you had some sort of fight with him, and I want to smooth things over if I can. We don't want any of that on this world—we want to get away from fighting here, Dane."

Chandler held his mind frozen. "I've been away," he said, ignoring Kennedy's words. "Something's happened to me."

He let down the bars and his mind opened up, enfolding Kennedy and all the other minds within reach of his. There was a moment of awareness, and then Chandler fell to the ground, writhing in agony.

"What's wrong?" Kennedy bent hurriedly to examine him. Chandler buried his face in the ground and wrapped his arms around his head to shut out the thoughts that beat against his brain. Kennedy lifted Chandler as if he were a baby.

Chandler peered into the

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bottom of Kennedy's mind, allowed his own mind to see through the windows of the other's eyes and into his brain. He yelled, broke loose, and dashed off heading for the desert.

When he was far enough from the colony he threw himself down on a sand dune and tried to collect himself.

Looking into Kennedy's mind had been like crawling through a pit of worms. On the surface Kennedy was a respected member of the community, a leader of men, a righteous and honest man. But under the coating of virtue lay a nest of hatreds, fears, pain-memories, with twisted dreams and evil schemes, coiling and uncoiling like prisoned vipers trying to break loose.

And Kennedy was considered a *good* man.

Chandler could see now why Oran considered his life over, why the remaining sane Chirenes had retreated to the desert. Whatever it was (that lurked below the surface of the Terran mind, it was not something which could be looked upon safely.

Chandler saw his fate clearly: he would have to resign from humanity.

You asked for it, a voice said. *The sorn sense was your greatest desire. Was it pleasant, the mind of your brother?*

"Let me come to you," Chandler pleaded. "You did this to me."

You were responsible for everything. Now face it.

Chandler scooped up a handful of sand and whirled it through the air. "But I'm worse off than ever. Now I'm neither man nor Chirene. Let me come to you."

We would if we were able, Chandler, the Chirenes replied. *We are not vindictive. But our safety must come before yours. Your mind is deadly to us.*

Chandler began suddenly to run across the sand toward the hidden city.

Stop.

"No!"

Now that you have the sorn sense, we have a power over you that we did not have before. We ask you not to come closer to us. You carry a plague in your mind.

"You can't stop me," Chandler shouted defiantly. "You can't just shut me out."

We can.

They unleashed a bolt of thought that slapped Chandler to his knees. He rocked dizzily, tried to withstand it, failed and fell.

Your mind is now open to ours. We can wipe it clean and

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eliminate the danger of your existence.

"No," Chandler said. Defeated, he sat up dazedly, rubbed his forehead, and slowly crawled away across the sand. The massed Chirene mind gradually withdrew its pressure until he was completely alone.

He stood by himself in the desert for a while, thinking. The Chirenes had cut him off, walled him up, cast him loose. They neither could nor would have anything to do with him.

And as for the Terrans?

He let his mind rove gingerly over the desert toward the colony, and, feeling only a mild revulsion but none of the horror produced by close contact, examined the thoughts of the Terrans much as he might study a drugged scorpion. No, there could be no return.

He wandered off in the desert, exploring the colony with his mind and, despite all, exulting a little in his power to project himself across miles into the minds of others. The emptiness of the desert sang to him.

He sensed an unfamiliar mental voice. Another. Two more. He probed a little deeper and found that they were new colonists landing. Chandler examined them detachedly. Farmers, young wives, all with the festering grimness in the heart of their minds.

Chandler had the greatest power known to the human mind. But it cut him off from humanity forever. Angrily, he kicked up some sand.

Perhaps, he thought, somewhere on Chirene there was a mind he could reach and touch and know without recoiling.

There must be one, he thought.

No. Not even one, came the reply.

I thought you weren't listening to me any more, Chandler said. *I thought you had let me go.*

Your thought broke through our barrier.

There is one, Chandler said. *There must be someone whose mind I can know.*

Then look for him, the Chirenes said, and withdrew.

"I'll live in the desert," Chandler said out loud. He thought of Terra with its teeming billions, and of the emptiness of space. "One by one I'll sound out their minds, looking, looking at the inner thoughts, the thoughts beneath the thoughts. There must be one. If not now, then later. I'll find him."

He extended a probing beam of thought, entered the mind of Jeff Burkhart, withdrew, found the mind of the farmer

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Hornaday, and withdrew again. They were not the ones.

Chandler squinted and saw a figure approaching him across the desert, waving to him as he trotted over the sand. It was Kennedy, Chandler saw. He turned, ignoring him, and started off deeper into the desert to begin his lonely vigil. He examined and discarded, examined and withdrew, looking, looking, as he headed for the heart of the desert.

Someday, somewhere, there would be an answer. He knew that, as he knew he was alive.

In the meantime, Chandler was alone—alone, with his terrible power.

More alone than he had ever been before.

THE END

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FACT

NEUTRINO ASTRONOMY

By BEN BOVA

A smaller sun, visible day and night . . . a heaven deprived of some if its most familiar constellations . . . an early-warning system to detect supernovae in their birth throes . . . this is the way the cosmos looks to scientists on a new astronomical frontier.

IN a salt mine near Cleveland, 2300 feet underground, where the only light comes from the fluorescent lamps on the gallery ceiling, a group of scientists are conducting an experiment.

They are astronomers. They are studying the Sun and stars.

They are "looking" at the Sun through nearly half a mile of solid Earth. Not only that. They "see" not merely the surface of the Sun, but directly into the depths of the solar core.

Obviously, these astronomers are not observing visible light. Nor are they interested in radio waves. They are studying one of the rarest, most elusive particles in all the strange lexicon of nuclear physics—the neutrino.

How Does the Energy Get Away?

One of the many paradoxes of modern astronomy is that, to study the infinite universe, astronomers must consider the infinitesmal atomic nucleus. The birth and death of the stars depend on nuclear processes taking place at their core.

It was in 1938 that Hans Bethe began unravelling the Sun's nuclear energy reactions. Suddenly astronomy became astrophysics, and the relatively new discipline of nuclear physics was applied to the oldest of man's sciences to explain how the stars could produce such prodigious amounts of energy.

The astrophysicists discovered that the Sun, and all the stars, were nuclear furnaces converting hydrogen into helium and radiating away energy. The Sun is a controlled fusion reactor about five billion years old, with

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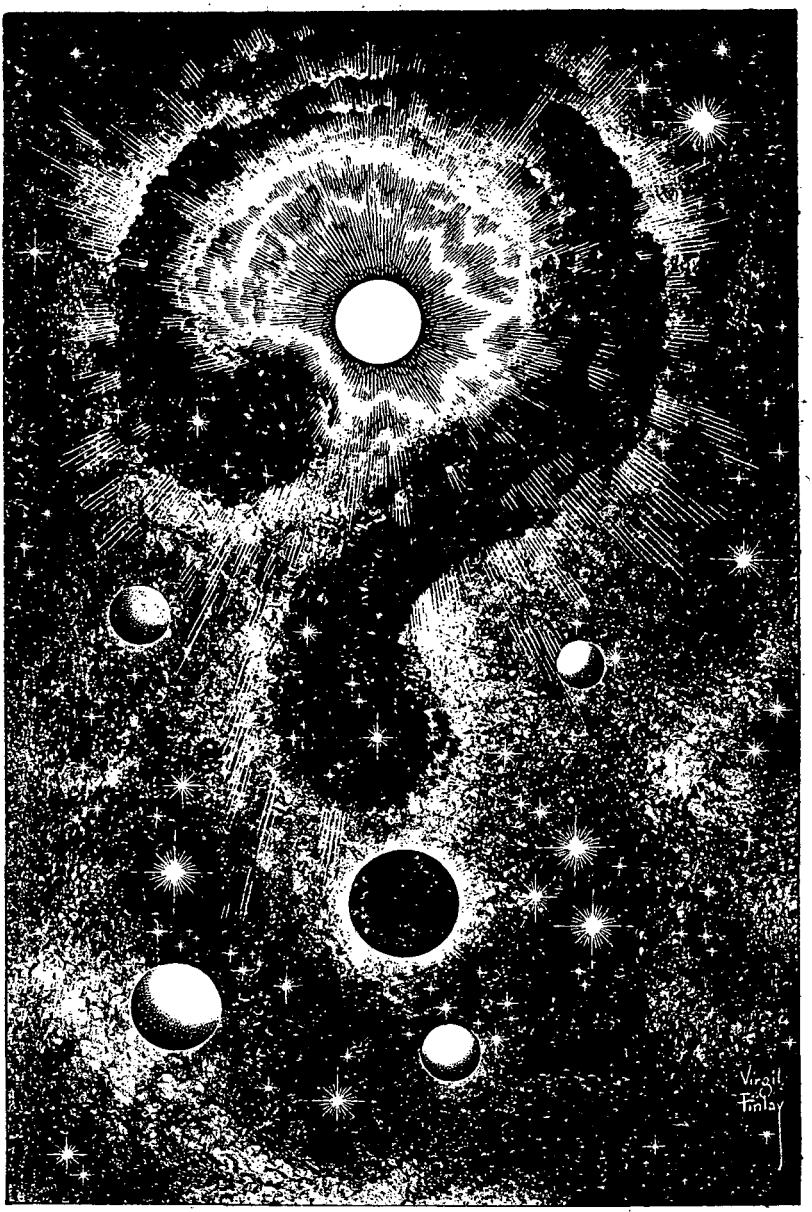

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another five or six billion years of stable life-span ahead.

Bethe (and Carl von Weizsacker, working independently) elaborated the now famous *carbon chain* (see Table 1). The net result of this nuclear roundelay is that four hydrogen nuclei (protons) are converted into a helium nucleus. Later it was discovered that the simpler *proton-proton* reaction yields the same effect (also in Table 1).

Both these fusion reactions produce the energy that we eventually receive as sunlight. What was not immediately realized was that these reactions also produce neutrinos.

BOTH the proton-proton and carbon-chain reactions take place in the Sun, with the proton-proton process contributing most of the energy output. It is believed that the carbon chain becomes increasingly important in stars hotter than the Sun.

Astrophysicists have come to the conclusion that as a star ages and uses up most of its hydrogen fuel, its central temperatures increase markedly. At these higher temperatures, helium nuclei begin to fuse into heavier elements. As the star continues to age and to heat up, constantly-heavier elements are produced in its core. But in some stars (per-

TABLE 1

Carbon Chain

$H^1 + C^{12} \rightarrow N^{13} + \gamma$
$N^{13} \rightarrow C^{13} + e^+ + \nu$
$C^{13} + H^1 \rightarrow N^{14} + \gamma$
$N^{14} + H^1 \rightarrow O^{15} + \gamma$
$O^{15} \rightarrow N^{15} + e^+ + \nu$
$N^{15} + H^1 \rightarrow C^{12} + He^4$

Proton-Proton Reaction

$H^1 + H^1 \rightarrow H^2 + e^+ + \nu$
$H^2 + H^1 \rightarrow He^3 + \gamma$
$He^3 + He^3 \rightarrow He^4 + 2H^1$

Key

H^1 = Hydrogen (proton)
H^2 = Deuterium, deuteron)
He^3, He^4 = Helium isotopes
C^{12}, C^{13} = Carbon isotopes
N^{13}, N^{14} = Nitrogen isotopes
O^{15} = Oxygen isotope
e^+ = positron (postive electron)
γ = gamma ray
ν = neutrino

Two nuclear fusion processes for converting hydrogen to helium, releasing energy in the form of gamma rays and neutrinos. Note that in the Carbon Chain, only four hydrogen nuclei (protons) and one carbon nucleus are required as input; the carbon nucleus, after several transmutations, returns to its original form at the chain's end.

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haps in all) this cycle is suddenly interrupted by a cosmic cataclysm. The star explodes. Not in the relatively gentle gas-puff of an ordinary nova. That type of event can be considered a mild burp; hardly more than 0.01 percent of the star's mass is blown away. Some stars go into a nova phase every few weeks. What we are speaking of here is a really violent stellar explosion—a *supernova*. This catastrophe virtually destroys the star. A supernova might release as much energy in 24 hours as the Sun does in a million years!

The Chinese observed a supernova on July 4 (!) 1054 A.D. It was bright enough to be seen in full daylight. Modern astronomers, using the Chinese annals have found the site of the cataclysm—the wildly-distorted cloud of incandescent gases called the Crab Nebula. Even today, 900 years after the explosion, those gases are hurtling outward through space at nearly a thousand miles per *second!*

Impressive as a supernova might be, it is even more puzzling to astronomers and astrophysicists. Why does a star explode? What mechanism can possibly exist that could permit a star to expel so much energy so quickly? How does the energy get away from the star? Until recently, these questions remained stubbornly unanswered.

The Particle That Had To Be

While the astrophysicists were puzzled by the supernova problem, the nuclear physicists had a much more serious matter on their hands. They were faced with a full-scale revolution that threatened to wreck the entire structure of modern physics. The furor was over a seemingly-simple nuclear reaction, the *beta decay* of neutrons. Some time ago physicists realized that the neutron is not a fully stable particle. It spontaneously decays into a proton and electron (which is also called a beta particle). The neutron's half-life is 12 minutes—a very long time, in nuclear physics, where billionths of a second are ordinary. If 1000 neutrons are left to themselves, within 12 minutes, 500 will decay to protons and electrons. In another 12 minutes, 250 more will undergo beta decay. And so on. There is nothing unusual about beta decay; it is one of the fundamental radioactive processes. Or so physicists thought, until they took a deeper look.

When a neutron undergoes beta decay, the energy of motion of the resulting proton and electron should be exactly equal to the mass-energy of the original neutron. This is the foundation of physics: energy and mass are interchangeable, but in any given reaction, you must end with exactly the same total

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amount of mass and energy that you started with. Mass and energy must be conserved; they can neither be created out of nothing, nor disappear into nothingness. Without this concept of conservation, the whole structure of physics collapses. And the beta decay of neutrons seemed to show that this conservation concept was wrong.

The energy of motion of the electron and proton should equal the mass-energy of the original neutron. But when the energy was measured, there was no equality at all. Most of the motion-energy goes to the very light electron. Measurement of the electron's motion (or *kinetic*) energy showed that in different instances of beta decay, its energy ranged from almost the right amount all the way down to zero. The electron did not exhibit the proper kinetic energy! Worse yet, it might fly off with almost any amount of energy. Where was the missing energy?

There were two possible answers: (1) The conservation of mass and energy was not a general principle of the physical world. (2) There was another particle, undetected so far, involved in the beta decay process. The first alternative would have meant that the world's physicists might as well start collecting bats' wings and bongo drums and become witch doctors. So they chose the second, and prayed hard that it was right. Wolfgang Pauli and Enrico Fermi worked out the theoretical requirements for the missing particle in the 1930's. It would have to be a neutral particle, no electric charge. It would have no mass (just as photons, particles of light, have no mass). And, again like the photon, it would travel at the speed of light.

Fermi gave the new particle an Italian name meaning, "little neutral one": *Neutrino.*

A skeptic might have pointed out that the neutrino had been invented by the physicists merely to avoid the ruination of the conservation principles. And on looking at the theoretical description of the neutrino, the skeptic might have thought the physicists were safeguarding their ruse by making it impossible to ever find the particle.

A particle of no mass and no electrical charge, moving at light-speed. How do you detect it? Other nuclear particles can be trapped in a few feet of lead, or made to leave tracks in a cloud, bubble, or spark chamber. The neutrino would leave no track whatsoever. And as for stopping it with lead—the neutrino can penetrate 50 *lightyears* of lead without interacting with a single atom! The neutrino is so aloof that it can pass through

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stars and planets as though they were empty space.

Neutrinos and Antineutrinos

If a skeptic would have been uneasy about accepting the validity of the neutrino, he was no more worried than the physicists themselves. They knew that they were treading on thin ice, but they had no alternative. All that stood between them and the downfall of physical science was the undetectable neutrino. But although the neutrino could not be detected, clues to its existence could be gathered.

The physicists returned to the beta decay process. They noted that if the neutron decayed into a proton and electron, and no other particle, then the proton and electron should fly away from each other on a straight line. This is not what happens. The proton and electron leave tracks in a cloud chamber that form a V, with the apex at the location of the original neutron. The V-shaped track leads one to suspect that a third particle participated in the decay of the neutron. A third particle that leaves no track.

The theoreticians began to define the neutrino's traits more exactly, and to fit it in with the rest of the growing family of sub-atomic particles—mesons, hyperons, anti-particles. They learned that the particle postulated in beta decay is actually an anti-neutrino, an anti-matter form of the neutrino proper. They predicted that neutrinos proper would combine with a neutron to form a proton and electron. The two reactions are written:

Beta Decay: $n \rightarrow p + e^- + \nu$

Neutron-Neutrino Combination:

$$n + \nu \rightarrow p + e^-$$

Key

n = neutron	ν = neutrino
p = proton	$\overline{\nu}$ = antineutrino
e^- = electron	

Other neutrino reactions were predicted, too. But the fact remained that the neutrino itself had not been predicted, but invented. As the years went by, the theoreticians' invention remained unseen and unconfirmed.

Water, Water Everywhere . . .

For a number of years, the neutrino theory lived in an uneasy state of apprehension. But the experimental tools of nuclear physics were steadily becoming bigger and more powerful. Enormous nuclear reactors and giant particle accelerators, "atom-smashers" such as the 30-billion-volt alternating gradient synchrotron at Brookhaven National Laboratory, became available to bring even the superelusive neutrino within the threshold of detection. How can you detect a particle that can travel through the entire Earth in about a quar-

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ter of a second, just as though it was not there at all?

First, the physicists realized it would be impossible to see the neutrino itself, or its track. So they would try to observe reactions in which neutrinos took part—watch the crime, so to speak, even though the criminal remained invisible. But the devilish part was to make the neutrino *do something!* They pass through matter as though it did not exist. The physicists were in the position of the Ancient Mariner, with neutrinos everywhere, but no way to get one to stop long enough to register on a detector.

However, the laws of chance held out a slim promise. If the physicists could monitor the passage of a large-enough number of neutrinos, sooner or later one of them would cause a reaction that could be detected. It was a slim promise—but no other was in sight. What was needed was size: big detecting equipment and huge numbers of neutrinos. In 1953, Frederick Reins and Clyde L. Cowan, Jr., of Los Alamos Scientific Laboratory, hopefully set up detecting equipment at the Atomic Energy Commission's gigantic production nuclear reactor at Savannah River, Ga. One of the world's largest reactors, the Savannah River pile produced an avalanch of anti-neutrinos some 30 times larger than the neutrino stream coming in from the Sun and stars. Theoretically.

The Savannah River reactor, like all fission reactors, produced neutron-rich products. The neutrons, through the beta decay process, yielded protons, electrons and antineutrinos. Again . . . theoretically. Reines and Cowan set up a detector that consisted mainly of water—1000 pounds of water. Water contains hydrogen, and hydrogen nuclei are simply protons. Anti-neutrinos would react with protons, the theoreticians claimed, to yield neutrons and positrons (the positively-charged anti-matter equivalent of the electron):

$$p + \bar{\nu} \rightarrow n + e^{+}$$

The water was doped with cadmium, which would capture the neutrons produced by the reaction. When a neutron is absorbed by a cadmium atom, gamma rays are produced. Also, when the positrons produced by the reaction meet electrons in the water, they annihilate each other and produce another set of gamma rays. Both the gamma rays produced by the neutron-cadmium and positron-electron reactions have characteristic energy levels.

Reines and Cowan set up electronic equipment—and shielding devices—that would register only gamma rays of the proper

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energy levels. The electronics showed that such gamma rays did indeed occur; therefore, neutrons and positrons were being produced in the cadmium-laced water; therefore anti-neutrinos were reacting with protons.

The anti-neutrino was found! The neutrino theory was verified.

With six years' hindsight, the experiment sounds easy. But out of a flow of some 10^{17} anti-neutrinos passing through the detecting equipment each *second*, Reines and Cowan were able to register about three reactions per hour. The anti-neutrino finally did something—but just barely.

The neutrino itself was finally captured some while later by Brookhaven's Raymond Davis, following a suggestion by Bruno Pontecorvo of the Soviet Union's Joint Institute for Research Studies. Davis' experiment was based on the fact that the nuclei of chlorine-37 atoms can absorb a neutrino and become transformed to argon-37 nuclei:

$$\nu + Cl^{37} \rightarrow A^{37} + e^-$$

Argon-37 is radioactive and can be detected, even in very minute amounts, by conventional radiation counters. Again, the experiment had to be on a large scale, because the neutrinos react so very rarely. Thousands of gallons of carbon tetrachloride, helium flushing systems, radiation counters, and much patience were required. But the neutrino was found.

Within the past year, a new type of neutrino-antineutrino pair has been found. These two new particles are associated with mu and pi meson—unstable, short-lived particles produced in cyclotrons and other accelerators. Not much is known about the meson-type of neutrino, except that it is evidently a different species from the original electron-associated neutrino and antineutrino. They seem to have the same physical attributes—no charge, and no mass, down to the limit that can be measured. But neutrinos coming from mesons do not engage in any of the reactions that electron-neutrinos take part in. Hence the suspicion that they are different species. Some physicists have suggested calling the new particle the "neutretto."

The meson-neutrino, or neutretto, is still too new to be understood well. Fortunately, it is the familiar old electron-associated neutrino that we are concerned with.

Today's Energy Today

We saw a few pages ago that the Sun and the stars are producing neutrinos. Detecting equipment similar to that used by Reines, Cowan and Davis is now being put into operation in

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a salt mine near Cleveland. The reason that the astronomers went underground, of course, was to screen out as much as possible the effects of cosmic rays and other spurious radiation that might trigger their detectors erroneously and confuse their work. The neutrino, of course, is blithely unhampered by half a mile of solid Earth. In fact, the detectors should pick up just as many neutrinos at midnight, when they must come up through the whole planet, as they would at noon, when they shine down from the sky!

What will the astronomers learn from solar neutrinos? No one is certain, at present. But scientists always welcome a new tool for investigating the physical world, and the neutrino will show the Sun as it has never been seen before. With an optical telescope, you can see the shining photosphere of the Sun. You are looking at photons of light that left the Sun's surface eight minutes earlier. But these photons represent energy that was released in nuclear reactions deep in the Sun's core *a million years ago.*

The Sun's energy is derived from the proton-proton and carbon-chain fusion reactions within its core. These reactions yield energy in the form of neutrinos and gamma ray photons. Now, at its core, the Sun's gases are 75 times denser than water (the solid Earth is about five times denser than water). The particles in the solar core are packed so densely that the gamma radiation produced by a fusion reaction is almost immediately absorbed by a nearby particle. The radiation energy is ultimately released by the particle, but at a longer wavelength. This "hand-over-hand" process is repeated countless trillions of times. The original gamma rays become X-rays, then ultra-violet . . . after perhaps a million-year-long oddysey through the Sun's immense bulk, the energy finally reaches the surface and is radiated into space as the yellowish visible light we are familiar with.

The neutrinos, on the other hand, have no such ordeal. Once created in the solar furnace, they head straight out, at light-speed, as though there were nothing at all in their way. When some of these neutrinos are trapped in Earthly detectors, we shall be observing energy that was released by the Sun little more than eight minutes ago. For the first time, we shall be seeing the Sun's current energy-output, instead of the tail-end of a million-year-long journey.

More yet. When solar neutrinos are identified, it will be the first experimental proof that

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the Sun is indeed a nuclear furnace. No one doubts that it is, but experimental proof would ice the theoreticians' cake nicely. What the neutrino-astronomers shall "see" is not the million-mile-wide ball of glowing gases that our eyes show us, but a smaller sphere that gives off neutrinos. If the size of this sphere—the solar core—can be measured, it may be possible to get some real idea of the Sun's age and probably life expectancy.

This inner core of the Sun is our star's real furance. The nuclear fusion reactions take place there—not *in* the core, however; on its surface. The core itself is believed to be primarily helium "ash" produced by the nuclear furnace. Along the spherical surface of the core, fresh hydrogen is being converted into helium, and giving off gamma and neutrino energy. Therefore, the size of the core is indicative of the age of the Sun—the length of time it has been fusing hydrogen to helium. Only a qualitative estimate can be made, probably; but a large core would certainly be older than a small one. If the size of the core can be measured, and compared to the total diameter of the Sun, estimates of the Sun's life expectancy might take on a solidity that is not now possible.

The Stellar Pituitary Gland

Not only might neutrinos allow us to estimate the Sun's age and life-span more closely. Neutrinos might well control the aging process in the Sun, much as the pituitary gland is suspected to regulate aging in human beings. We saw that the proton-proton fusion reaction is responsible for most of the sun's energy output. Strictly speaking, the term *proton-proton* is a misnomer. Two protons cannot combine, their mutual positive electric charges repel each other. However, under the proper circumstances, a proton can emit a neutrino and a positron, and change into a neutron. A proton and neutron *can* combine to form a deuteron (the H^2 of Table 1). Once a deuteron has been formed, the rest of the so-called proton-proton reaction can take place.

It has been estimated that on the average, a proton in the Sun's core gets only one chance every few thousand years to penetrate the electrostatic barrier of fellow proton deeply enough to have a chance to form a deuteron. And of these rare occasions, only once in 10 million times will one of the protons happen to emit a neutrino at the propitious time and allow a deuteron actually to be formed. Thus, for the Sun, the emission of neutrinos determines the rate

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at which deuterons are formed. The rate of deuteron formation determines the rate at which fusion reactions can take place. The fusion reaction rate determines how quickly the Sun is consuming its hydrogen fuel—how fast it is aging. So the neutrinos determine the pace of the Sun's evolution. They also carry off some 10 percent of the Sun's energy outright, flying straight out from the solar core with it, as soon as they are produced.

"Neutrino Stars" and Supernovae

As a star ages it becomes hotter, not cooler. At some time in the future, the helium "ash" at the Sun's core will become dense enough and (because of the pressure) hot enough to begin fusing into heavier elements, such as carbon, oxygen and neon. Later still, these elements will transmute themselves at even-higher temperatures into even-heavier elements. Many stars in the Milky Way galaxy have gone through this evolution and have passed along the road to extinction. The Crab Nebula, with a feeble white-dwarf star at its center, is a spectacular example. Less dramatic, but nearer at hand are the white-dwarf companions of Sirius and Procyon. Other stars are in the midst of this evolution; these are the red giant stars—Capella, Aldebaran, and Arcturus are three easily-observed examples.

As a star gets older and hotter, its neutrino emmision increases. When a critical temperature is reached, a new process for creating neutrinos comes into play, and the star begins to lose even more of its energy to neutrinos. This new process does not require atomic nuclei. All that is needed is electrons and their anti-matter equivalents, positrons. Under ordinary conditions, when an electron and positron meet, they annihilate each other and yield a pair of gamma ray photons—pure electromagnetic energy. But in the core of a hot star, electron-positron annihilation can sometimes result in the production of a neutrino and anti-neutrino, instead of gamma rays.

This is a critical factor. If an electron-positron meeting produces gamma rays, it is quite likely that somewhere else in the star, a pair of gamma photons are colliding to produce an electron-positron pair. The two processes are in balance. The star loses no energy. But on the rare occasion when an electron-positron collision produces a neutrino and anti-neutrino, these two particles fly straight out of the star. The energy is gone forever.

Neutrino-antineutrino production by this method is very rare, even at temperatures of 600 million degrees Kelvin. Cal-

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culations show that only once in 10^{20} electron-positron collisions will a neutrino-antineutrino pair be formed. But astrophysics is filled with large numbers. Aged, hot stars produce neutrinos and antineutrinos at a pace brisk enough to seal their own fate. At high-enough temperatures, a star can produce so many neutrino-antineutrino pairs that these particles will carry off all the star's energy in a little more than 24 hours!

When that happens, the star has no recourse but to collapse violently. This collapse heats up the star to the point where its core literally explodes—a titanic nuclear bomb. The star is torn apart by the blast wave of the explosion. This is the answer to the puzzling question of the supernovae. Ironically, the explosion produces still more neutrinos, of the highest energy of all. Supernova explosions might also be the source of cosmic rays, many astronomers believe.

The Neutrino Universe

The age of neutrino astronomy is apparently close at hand. What would the universe look like, if we could really see neutrinos, instead of visible light?

The Sun, of course, would be a much smaller disk. And it would be visible regardless of the time of day, because we could see it shining through the Earth. The heavens would be greatly altered. Most of the constellations would disappear, since their stars are only dim emitters of neutrinos. But perhaps familiar Orion would not suffer too much, since that constellation is composed mainly of very hot stars that should be beaming neutrinos at a prodigious rate. (The Orion stars are young, but for the most part very large and hot bluish giants and supergiants.)

If we were capable of watching the stars for millions of years, we would notice the neutrino-brightness of some of them steadily increasing. And where we saw a steady increase in anti-neutrinos as well, we would know that a supernova is on the way. In fact, one of the first tasks the neutrino-astronomers have set themselves is to monitor the occurrence of anti-neutrinos, in an effort to create a supernova early-warning system.

Neutrino astronomy is still too new and untried to have had any effect on astronomy as yet. Still, 20 years ago, radio telescopes were in the same condition. Radio astronomy has since added a new dimension to the old science of star-gazing. Will neutrino astronomy have as great an impact? It seems very likely.

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Illustrated by SUMMERS

THE HAPPIEST MISSILE

BY RAYMOND E. BANKS

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Have you wondered when anyone was going to get around to kidding the gantry off rockets and rocket-men? Well, here it is at last—the funniest story about missiles since Sputnik and Explorer said "Auf wiedersehn" to each other.

POSSIBLY the most secret missile base in America is a tiny affair tucked away in a pocket of the California desert. It is so secret that some say the commanding officer signs his orders under an assumed name. Point Crystal is, of course, not the real name of the base. (California may or may not be the real name of the state.)

Therefore when the strange and wonderful flight of the TERRIBLE TURK took place, it was easy to conceal the events. To put it bluntly, there never has been or probably never will be again, a test flight such as we

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participated in last May. My name is Conklin, electronics engineer, civilian. I was part of the Van West group that was assigned to check-out the electronics on the TURK missile.

Our troubles began when the various parts of the TURK, shipped in from widely scattered locations in the country, were finally assembled at Point Crystal, and Van West and I went there to manage the shoot.

"*That* is a missile?" said Van West, when we examined the TURK shortly after our arrival. The Commanding Officer, (I won't mention the service, and you can't find out, because Point Crystal has been put under the Department of Health, Education and Welfare, for purposes of secrecy,) John Hearn, said testily, "Professor Van West, you must understand that we assembled this missile with varying crews at different times of day. At no time were any of the men allowed to see what the others had done. Ours are the first human eyes that have seen the missile in its entirety."

We walked up slowly, and in the case of Van West, a serious expert, with what I thought was a good deal of awe, on the TURK. It was shaped like an English Oxford. Van West kicked the side of it and listened to the reverberating boom inside. It was his practice to kick missiles to feel of the quality. As a real expert he could tell pretty much how it would go, just as a housewife taps her watermelon in the supermarket.

"Hmmm," said Van West.

"That's a polished surface," said Hearn in shocked protest. "The slightest dent in it will cause a high degree of error in flight."

It sounded like Hearn had been reading service manuals, or perhaps even textbooks, and Van West winked at me. "I'll be careful," he promised Hearn, scratching a kitchen match on the missile's side and lighting his cigar. It left an ugly yellow slash on the polished side.

Hearn had blanched white and plucked at his sleeve. "The fuel—the fuel," he gasped. "It's so volatile that it will explode on contact with a match flame at two hundred yards."

"Hmmm," said Van West. He flipped open the fuel intake cap and peered inside. He dipped a finger in the tank and tasted the fuel. He scratched another match and held it in front of the tank. It lit up a pretty blue, while Hearn crawled all over me trying to get out of range.

"A new fuel with plenty of alcohol in it, Conklin," said Van West significantly.

"Just like cherries jubilee," I had to agree.

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"The manual promised an explosion," said Hearn weakly.

"Well now, Commander," said Van West, "Your contractors will exaggerate a little, to impress the government."

He blew out the flame and turned the handle of the hatch to the interior. The handle came off in his hand.

This was while Hearn read to us about the high precision, tested quality from a book, which, for the purposes of secrecy, was in a cover of the Department of Health, Education and Welfare, entitled, "Colic in Babies—A Treatise for Young Mothers".

"The handle works quite easily," said Van West, handing it to Hearn. "But how do we get in it?"

Hearn colored and muttered something about inspections, but I assured him that the missile inspectors for the Department of Health, Education and Welfare probably weren't *quite* so highly trained as those in the Defense Department.

Van West kicked the missile so hard he left a heel print. The door popped open, and we went in.

"I wish you wouldn't do that," said Hearn. "Several million dollars, and two years of the lives of myself and my men have been devoted to the supervision, assembly and coming flight-test of this missile. This is the only one, and if it fails, our work will have all been in vain."

Van West spoke from the inside. "I like this missile," he said. "It is a sophisticated missile, and I like the sophisticated feel of it."

"Are you supposed to like a missile?" asked Hearn testily, stepping inside. He took off his service cap reverently.

"This cabin is quite comfy," said Van West, and Hearn glared dark blood at him.

"This cabin," said Hearn, "was scientifically designed to house three of the highest trained, most alert, most carefully selected men in the service. They are due to arrive this afternoon. All I have to know from you is if the electronics work—and how soon can we fire?"

"Hmmm," said Van West. He eased open a control panel—he was surgeon-loving about electronics gear if not the missile hulks that carried them. Inside was a maze of wires. Several of them were taped off in evident exasperation, and an unknown technician had pencilled in a draftsman's hand "Nuts!"

Van West scratched his chin with the wasted wires. "Pretty fair, for wiring," he said. "Average-good I'd say. Conklin, what does the reading say on that plate."

"WARNING," I read, "THIS INERTIAL NAVIGATION EQUIPMENT

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IS SO SENSITIVE THAT A SNAP OF THE FINGER WILL SPOIL ITS ACCURACY."

Van West closed the panel, turned on the dials. No lights lit. No dial needles lifted. He banged the panel with his closed fist until our ears were stunned. The lights lit, the needles got busy.

"My God!" cried Hearn.

"Don't worry," said Van West. "They build in a safety factor for idiots like me."

"How soon can we fire?" asked Hearn, wiping his forehead.

"I'd say as soon as you reassemble the first and third stages which occupy second and fourth places," said Van West, his mild blue eyes on Hearn. "In its present assembly, the TURK will go one hundred and fifty miles up, and two hundred down immediately thereafter. This is simply not good missile arithmetic."

Hearn nodded dumbly. "We had the men work with their hands under tarps," he apologized. "Secrecy you know."

"Naturally," said Van West, flushing the little toilet off the cabin. "My God, the plumbing is first rate. But really good!"

A lieutenant stuck his head into the missile, eyes blindfolded of course. "Sir, the ladies are here."

"What ladies!" cried Hearn.

"The missile crew from the Department of Health, Education and Welfare. The highly-trained, prime crew for the TURK."

"Are you sure!" cried Hearn.

"Sir, I haven't seen them, according to your orders," he lightly touched his blindfold, "but they have ladies' voices and one of them asked for the powder room, so I think they're ladies all right."

"Steady," I told Hearn. "It could've been mice or monkeys."

Did I mention that Commander Hearn had a mustache? It bristled a half hour later as the three ladies from the Department of Health, Education and Welfare gingerly climbed into the missile and sat down tentatively on the reclining pads provided for the crew. Naturally, due to the extreme gravity of missile travel, they would have to take off lying flat on their backs.

There was no doubt that Health, Education and Welfare was right on the nose. Miss Larson was from Health, a big-boned, lanky Swedish massage type of woman, who looked as if she had just finished or was about to start gnawing a carrot. She patted the reclining pad with her baseball player's fingers.

"Too soft," she said. "Spine not well-supported."

"It's different with gravity," said Van West mildly. "Gravity

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will make that foam rubber feel like a cement sidewalk."

Miss Larson smiled, showing horse-sized gold teeth. "I think I like this gravity, much," she said.

Miss Stone, the second lady, reminded me of the only social worker I ever knew. She was thin, wore glasses, had large human eyes, and a sympathetic mama-like bun of hair. It was easy to see that everybody's welfare was hers. "Shan't we take some food for—er—the natives?" she asked.

"We wouldn't want to bring them our germs," smiled Van West kindly.

She nodded. "I have brought some albums of folk-songs," she said. "Some nineteenth century Indian war chants, and some minuets. I thought—er—the natives might want to know something of our culture."

That was when Commander Hearn really began to bristle.

"Ladies," he said. "I must recheck your orders. Most missile crews—"

"Oh, but there is no mistake," said Miss Castle, the last and best looking of the three. She had identified herself as a teacher. That may be, but they didn't have anything like that teaching the sixth grade when *I* went to school. Her eyes were a rich blue, her smile a succession of delightful dimples, her figure the kind men have always appreciated.

"No mistake," she said. "We know all about breathing oxygen, and how to act in blackout, and feeding ourselves under gravity-free conditions. The marines taught us."

"You three—at a marine training camp?" I asked.

"An isolated marine training camp," said the lovely, eyes rich with laughter.

"Yah, the food was good," grinned Miss Larson. "By golly, they had a sergeant could out hand-wrastle me."

"Did the marines—offer to compete with you, Miss Castle?" asked Van West.

Miss Castle tossed her silk-gleaming curls. "They did," she said. She shook loose a six-inch long instrument that looked like a Florentine stiletto, a hatpin, and smiled.

That's when Hearn reached the top of his bristle. "Ladies, while in my command—a military manner—"

But Van West waved a hand. "We'll get rid of something to accommodate it, Ma'am." He looked around, found a compass and jerked it loose from its moorings. He tossed it to me. "Silly thing to have in space. So who cares North?"

Hearn closed his eyes but controlled his voice. "How soon—dear Lord—I mean Mr. Van West—can we fire?"

Van West licked his forefinger

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and stuck it out of the porthole feeling the wind. "Anytime, starting in about six hours. if you can get those firing steps changed."

"Shouldn't you check with our meteorological service?" asked Hearn. "It's the finest on—in near, at any event the finest wherever we are. It has almost a million dollars in weather-predicting equipment, including a computer a block long. It—".

But Van West wet his finger and stuck it out again.

"Six hours," he said shortly, clumping down off the missile. "Come on, Conklin. Time to start the countdown."

Going out we bumped into Lt. Spicer, still blindfolded, carrying the ladies' luggage.

Hearn moved off with Van West, pale but gritting his teeth. I stayed to watch the tall young lieutenant, blindfolded, deliver his luggage. His problem was that Miss Stone, the welfare girl with glasses, sounded like Marilyn Monroe. He tried to hand her the luggage, feel her hand, feel her arm, but she evaded him. Miss Castle, the beauty, looked at him speculatively, I thought—automatically lifting her hatpin, then seeing he was blindfolded, then seeing his preoccupation with trying to home on the source of the honey-sweet voice of the dried-up, but nice Miss Stone. I thought she made her voice sound much coarser when she got her luggage. He practically tossed it to her and tried to follow the blushing Miss Stone around the small cabin. But he got stuck on Miss Larson, who let out an athletic yelp.

I couldn't see the male of the species degenerated any more. "There's a helluva bugle call going on over there," I called to the poor, blindfolded lieutenant. "Mean something?"

He sighed. "Supper. Please give me a hand, Mr. Conklin."

We walked towards the barracks. "This Miss Larson—rather plump for a missile maverick, huh?" he said as we walked blindfolded.

"Rather," I said noncommitally.

"But—uh—Miss Stone—she sounds nice."

"A warm person," I said. Now that the ladies were out of hearing, making themselves at home, or whatever female astronauts do, I felt a perverse streak coming up in myself.

"Warm person—usually nice nice and—uh—nice figure," he said.

I grunted.

"This Miss Stone," he said, when I didn't amplify. "I—I'm just guessing. I'd say she had blue eyes from the sound of her voice. Lovely blue eyes!"

"I didn't notice."

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"She—ah—sounds young and you know, alive, fun to be with, like on the beach with a nice figure in a cute bathing suit," he said.

"What do you think of Miss Castle?" I asked.

He shrugged. "I haven't had a date in six months. Now this Miss Stone. . . ."

I was too mean to enlighten him, and too sympathetic to lie.

"Son, in a space-suit they all look alike," I told him.

I sat facing the peaked edge of Lt. Spicer's blindfold as we ate. He was really quite good at eating blindfolded after six months. Hearn ate stolidly. Van West ate with zest. From time to time Harry, our crew chief, came in and cried, "Aitch plus five hours!" Then he'd go away.

"Shouldn't you be in the blockhouse?" asked Hearn of Van West.

"I never go into concrete blockhouses until the last minute," said Van West. "Asthma. Concrete dust gets me. My man, Harry, will keep me in touch with the count."

"It'll be a great moment when the TERRIBLE TURK lifts," said Hearn unconvinced. "I've invited some of my friends to come over. Uh—do you think we might shoot a little early—get the missile women out of si—into the missile a little early? The mixed up stages have been adjusted."

"Six hours," said Van West.

Lt. Spicer's head looked like a miniature snow-plow as he turned his face to converse with another blindfolded lieutenant. "She has hips like a grown-up golf ball," he said. "I can tell it from this Miss Stone's voice."

The other lieutenant pointed his miniature snow-plow head at Spicer "You're too late, buddy, old buddy. While they were getting checked-out for security. I dated that Miss Stone. It seems she's never ridden in a jet airplane."

Spicer's blindfold trembled. "Oh, you rat!"

"Looks like you're stuck with Miss Castle," I told Spicer.

"This stew tastes like old rubber-bands!" cried Spicer in agony.

"Here, here," said the Commander. "We've been getting the finest food that the services can provide." He allowed his mess steward to pour him a vast glass of something very spicy. "The finest!" he said in horror, drinking, looking out of the window at the TERRIBLE TURK and shuddering. I turned my face in case he broke into tears.

It was H-hour minus sixty-eight minutes.

"H-minus eighty-six," Harry said, coming into the commander's comfortable office where we

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were gathered. He had his numbers mixed again. Sixty-eight and eighty-six always gave him trouble, but Van West and I automatically allowed for it.

Not so Commander Hearn, General Jackson, and Provost Steel, his friends from a neighboring military base that had come to see the shoot. They bustled around the office, changing all the clocks and Hearn got on the phone to bawl out his base electrician.

One large window looked out on the TERRIBLE TURK, pointing its neat oxford nose low in the sky.

"Someone is nailing boards over our window!" cried General Jackson, having left off clock-winding to pick up his binoculars.

"Ah—yes," said Commander Hearn, "I don't—uh—want any glass shattered. My glass bill is fantastic—something you non-missile boys don't have to worry about."

"But we won't see the shoot!" cried Provost Steel, tossing off a glass of Hearn's liquor.

Hearn poured himself from the same container. "Ah, well," said Hearn. "They're all alike—a big bang, and a lot of dust."

"Like to meet your crew, Eddie," said Jackson. "Must be sharp, brave lads."

"They—uh—too busy," said Hearn.

At that moment the door burst open and an apparition came in. It was actually only Miss Stone wearing all of her space-suit but the fishbowl. The webbed space-suit looked like she was sitting down on her thin figure.

"Commander, I must have a needle for my record-player," she said.

Before he could answer Lt. Spicer burst into the room. "I have a needle, Miss Stone!" he cried joyously. "I found a needle for you!"

The other door opened at the same time to reveal a blindfolded Lt. Wiggins. "Here's the needle you wanted for the space flight, Miss Stone!" he cried. "Guaranteed to last a thousand spins!"

Miss Stone took refuge behind Van West who was patiently trying to get on with his reading of LOLITA. "A hand fell on me while I was trying out the reclining pad!" she whispered hastily.

"Gentlemen!" roared Hearn.

The lieutenants stiffened, saluted and vanished very rapidly considering their blindfolds. Miss Stone went too. "I feel so darn silly in this space suit," she said. "I hope I don't scare those natives."

She vanished.

Provost Steel dropped his mouth open. General Jackson stared first at the door, then at

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the liquor, shook his head and stared at the door again.

"Looked like a woman, by God!" he said.

"Couldn't have been a woman," said Steel. "Not for missile crew. Probably a young recruit."

"Crew," said Van West.

"Crew?" said Jackson.

"Creewww!" whistled Provost Steel.

"Crew," groaned Hearn.

His two old friends stared at him with gathering disbelief and shaken confidence.

"There has to be a first woman *sometime!*" cried Hearn in agony, drawing himself up straight, twenty years of service to his country behind him. It was his first missile shoot and he had brag d for months.

His two old cronies stared in silence. Then General Jackson stepped to the window. "Resume boarding up the windows!" the General ordered. He filled his glass and lifted it. "Anyway, here's to Korea!"

"Bulge," said Provost hoisting his glass.

The words came as fondly as a lost dream to Hearn's lips. "Vella-LaVella, Kwajalein—Guadalcanal!" he said lifting his glass.

They drank.

I tapped Van West's knee. "It seems a bit thick, Van," I said. "After all those poor girls—they're really going to be hurled in space. And the missile does seem skimpy. I'm surprised."

Van West gave me a conspiratorial look. "This late I can tell you the truth, Conklin. It's an anti-success missile."

"Anti-success missile?"

"It isn't supposed to leave the ground. Rises gently six feet, bumps back. Defense is tired of all the outrageous publicity we give to our shoots. Since one more miss won't hurt much, they've used this project to draw off the attention of the press and the snoopers who want to make America seem inadequate. Planned two years ago. Perfectly kept secret. Tonight, in Florida, they're rasing a real donkey to kick the sky!"

He winked at me and drank a sip of Hearn's dew. "So don't worry about the ladies."

"Poor Hearn," I said. "His first missile."

Van West laid aside his book. "*However,*" he said, "the TERRIBLE TURK will *not* fail. In fact, it will fail as an anti-success missile, because it is going to succeed!"

I stared at him stupified. "It *will* fire?"

"Yes, my dear boy. Make one of the finest shots in missile history. Everybody was relaxed when it was drawn up. Since it wasn't going anywhere at all, nobody drove somebody else crazy checking up on them. They let

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the designers design. They let the metallurgists try a new re-entry alloy. They let the fuelmen pull some new wrinkles. The TERRIBLE TURK is as relaxed as an old shoe—but it'll shoot clean and true, it'll tear a corner off the moon, bounce in the dust off Mars and knock a hole the size of the house in the sun!"

Van West was never wrong about missiles.

"The ladies!" I cried.

Van West waved at the window. "You'll notice I've set it on as low trajectory as possible. The orbit will be very flat, I hope. However, it needs about four-hundred more pounds to keep it down."

"How can you get that much weight into it now?" I asked. "It's all trimmed and tight. By now even Miss Stone must be getting strapped into her bunk by the blindfolded—Lieutenants Spicer—and—Wiggins—"

"Exactly," said Van West. "Four hundred pounds of clean, young blindfolded American manhood. Harry is supposed to get them out. But he'll maroon them in the aft compartment that started out to be a motor and got abandoned. Plenty comfortable in there—with a wall between the sexes, so to speak, during its flight. Washington will be pleased."

"But Van—those poor guys, under gravity!"

"A while ago I dragged some old sleeping bags in there. With inflated air mattresses. Same thing as the ladies have, but cost eleven dollars and sixty-eight cents instead of five thousand for the regular gravity pads. As soon as they see they're trapped, they'll have the sense to use them."

"Food and water—"

"There is a small hole between the girls and the men's compartments," said Van West. "The girls may pass food to the men—if the men sweet-talk them enough."

"Van," I said, "Van."

"The Russians," said Van West "are going to have a hard time understanding this one."

"Aitch minus ten," said Harry, coming into the Commander's private men's room, where Van and I watched the TERRIBLE TURK through a small window. A mushroom of fire beat out around its tail. It was taking off.

"Thanks, Harry," said Van, and Harry left still thinking he had ten minutes to go.

Out in the main office with the boarded up window, Hearn, Jackson and Steel softly sang, "Off We Go Into the Wild Blue Yonder—" It was dramatic.

Now we saw the TERRIBLE TURK shake herself and peer uncertainly at the horizon, like a young canary about to take first

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flight from her nest. The TURK rose tentatively in space, trembled, liked the feel of flight and jumped towards the hills like a giant's foot skimming over the earth. It was clean and beautiful to see. I understood at once that it would reach the sun and keep on going, if it wanted.

"Yoicks!" cried Van West. "Yoicks, damn you, yoicks!" He practically danced all over the commander's bathtub, shouting "Yoicks!" eyes blazing, mouth wide in appreciation. He did love to see a clean go-off.

It was silent in the desert.

"I didn't like your countdown," I told him. "It was careless—and cruel to those young people."

Van West rose slowly from the bathtub. "Conklin," he said, "That wonderful TURK never needed a countdown. It's just a comfortable piece of the world's finest metal, powered by the world's most potent fuel, carrying a couple of the world's best radios. All it needed was a match to touch it off—zoooooom!"

"But all those poor guys slaving in the block house!"

"Look," said Van, "suppose I told them they weren't needed. On a fine, clean shoot like this. One to be proud of. No, Conklin, it's got to be *their* victory, too!"

Harry appeared at the door. "Aitch minus five," he said. "She goes in five minutes."

"Thank you, Harry." said Van as I helped him from the tub.

We tiptoed past Hearn and his friends. Hearn had his finger pointed at Jackson. "Billy-Bally!" he said. "Your men *did* call you Billy-Bally!"

We stopped at the radio central.

"JPL's Goldstone reporting first tracking report on the TURK, sir," said the grim-faced lad.

"What do they get from the TURK?" asked Van West.

The man turned up the volume. We heard the loud, unmistakable sounds of a minuet tinkling out. It was for stringed quartet.

"Very pretty, very sweet," muttered Van West.

"Goldstone is puzzled sir," said the operator.

"Here comes the TURK pass over Europe!" cried the next operator.

"Read us, read us!" cried Van West.

This time we heard the clear sounds of a human voice. "And a one—two—three—four—hands to hips—down—up—get out—those crinkles—three—four—down—up—three four—" came the tones of Miss Larson.

"Gravity does leave you with heavy muscles," nodded Van West.

"This is incredible!" cried the operator.

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"Imagine the listening Russians," said Van West.

We sat and waited. The party was over in Hearn's office. He was bent tightly to his direct "hot" phone to Washington, with Steel and Jackson bent over his shoulder like three racetrack touts hearing the race returns.

"But, sir, but sir—" Hearn was spluttering. "I didn't *know* it was supposed to fail!"

An orderly dashed down the radio panel board line. "Our own tracking station has TURK on her first loop of the world!" cried the orderly.

Commander Hearn shushed Washington for a moment. "What signal do you get!" he cried.

The orderly gulped. "A—a woman's scream, sir. Also, a man's hoarse yell—something about a—excuse me, sir—damned hatpin!"

Hearn sighed and put the receiver back to his ear. "Go ahead, Washington," he said. "We didn't get anything significant on her first pass over us."

"Do you suppose the men broke through to the women's compartment?" I asked Van West.

But Van was in action already. He gripped the microphone in his hands. His grip was so tight, his hands were white.

"TURK. TURK! Listen to me. This is Van West. Listen! You must repel those young men, ladies. America cannot stand to have a scandal of this sort. You *must* keep your wall intact. Try the pine-scented aerosol bomb near the forward hatch. Squirt it through their hole! What—it's no use—they're almost through the wall? TURK—listen—this is an emergency—cut off their oxygen. Do you recognize the oxygen container. No—turn it OFF. Read the words—OFF!"

He sighed and set the microphone down. "They're out four hundred miles already. Those poor girls at the mercy of these long undated young men—"

He swung on Hearn. "You idiot!" Van West roared. "How dare you undate those young men for six months. I'll have you broken to a prisoner-of-war for this!"

Hearn, catching it from Washington, now from Van West looked goggle-eyed. "I—it—secrecy—" he babbled.

Van West went over and grabbed Hearn bodily. He took the Washington "hot" line. "Goodbye" he told the phone and hung up. The phone immediately began to ring incessantly. Van West lugged Hearn to the microphone. He thrust it in the Commander's hand. "On the next pass, you will order those young men to stand at attention until further notice," he cried. "Until we can get my wonderful TURK

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down! I will not have a rape on my missile."

"Yes, sir," said Hearn weakly, wetting his lips.

Van West swept up the angrily ringing Washington phone. "This is Van West," he said. "We have a crisis out here! Shut up the phone ringing, or I may go back to Germany. . . . No, by God," he cried, "I'll go to *Cuba!*"

He hung up the phone. It did not ring again.

"Here comes the TURK!" cried the operator.

"So soon," muttered Van. He looked dejected now. As if suddenly, it had all passed out of his hands. "You—" he said to Hearn. "You do not grasp—"

That was *my* moment of glory—to contribute something to the great TURK victory. I leaped to the microphone and snatched up from Hearn.

"Turn on your loudspeaker," I ordered the TURK. "You, Miss Larson. The thing that looks like a diathermy machine."

"Yah, I did," came back her faint voice a thousand miles up.

"Spicer!" I yelled. "Wiggins! She looks like Alice the Goon! They ALL look like Alice the Goon! Except Miss Castle. She has a hatpin!"

The TURK was past us again.

"The TURK is silent," said Kansas City.

"Silent," said Florida.

"The non-existent American missile, proved its non-existence on its third pass over Russia by not sending any signals," report Russia.

They all slapped my back.

"But how will those poor, brave kids get down?" cried General Jackson.

"They'll land at Los Angeles International Airport tomorrow at nine-twenty," said Van West, allowing himself a pip of Hearn's dew. "Between Flight 201, TWA, and American 606 from Kansas City."

"How do you know?" asked Provost Steel.

"When I plan a trajectory," said Van West, "I know."

"My missile is a success?" asked Hearn trembling.

"A big success," said Van West.

"How big?"

"Remember Patton?" he said. "MacArthur? Eisenhower?"

Hearn nodded mutely.

"You'll walk on their heads in the history books," said Van West. "Boy, you'll walk right down the sky!"

That's it, I guess. The happiest missile Van West and I ever shot. Except to report that recently Lt. Spicer sent me a hatpin, which suggests several interesting possibilities.

THE END

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The body in his arms was that of a visitor from outer space!

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By PAUL FAIRMAN

The COSMIC FRAME

A boy, a girl, a sleek-lined convertible and a lonely road. It was the perfect setting for romance—until a weird figure stepped into the glare of the headlights. The dull crunch of splintering bones told the story of one more death on the highway.

But there was a unique kind of problem here: how can there be a case of manslaughter when the victim isn't human?

THE blue light flashed out beyond Pelham Woods. It was seen by several of the boys lounging in front of the barber shop on the main street of Kensington Corners. "Now what in the nation was that?" one of them asked.

"Low lightning. What else?"

"Didn't look like lightning. Held too long. Besides, there's no clouds over there."

"Might be some low ones you can't see for the trees."

Sam Carter, fresh from a late-afternoon shave, came out of the barber shop and said, "What are you fellows arguing about?"

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"Just saw a flying saucer."

Sam grinned. "Only one? Nobody's got a right to brag these days unless they see at least six. And they've all got to spout at least five colors."

"This one was blue."

"Always preferred the yellow ones myself." The boys grinned lazily and Sam looked across the street and called, "Lee! Hold up. I'm walking your way."

Lee Hayden, a big, sour-faced man stopped and waited and when Sam Carter came abreast, asked, "What are those no-good loafers jabbering about today?"

"Flying saucers. A blue one this time."

"Uh-huh. Good a way as any to kill valuable time."

"Oh, they're all right, Lee. Say — it looks as though things might be getting serious between our kids."

Lee Hayden snorted. "Darn fool kids. Don't know their own minds. It's a sign of the times."

"Oh, I wouldn't say that. My Johnny's pretty serious about life. I've got a hunch Joan will be good for him."

Lee scowled. "Kids these days never have a thought about tomorrow—where the next dollar's coming from. All they think about is getting hitched—making more trouble for themselves—going into debt."

"It always seems to work out, though. Nothing wrong with either of them that marriage won't cure." Sam Carter was one of the few men in Kensington Corners who liked Lee Hayden. Most people resented his sour outlook on life and his money-grubbing instincts. Sam understood the man, however, and this was fortunate for the sake of Johnny and Joan. Sam said, "Looks like their date tonight's a pretty important one. Johnny asked me for the Packard. Doesn't want to propose to his girl, I guess, in that stripped-down hot rod of his."

"They're too young to get married."

"Well, maybe it won't happen for a while," Sam said, easily. "See you later, Lee." Sam turned in at his gate and Lee Hayden went on down the street, scowling as usual.

While, out beyond Pelham Woods, the space ship with the blue exhaust settled on the surface of Nelson's pond and sank from sight.

Sam Carter's phone rang sharply. He awoke and shook the sleep from his eyes. He snapped on the light and not-

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ed that it was one-thirty as he picked up the phone. "Hello?"

"Hello — Dad! Are you awake? Listen to me. Please—"

"Johnny! What in the devil's wrong? You in trouble?"

"Bad trouble, Dad!"

Sam's feet were on the floor. "An accident? Anybody hurt? Damn it, boy! You should have been home a long time ago."

"Don't lecture me, Dad. Just listen!"

Where are you? Tell me about it."

"I took Joan to the dance at Storm Lake and we were on the way home when—"

"When *what?* Talk, boy!"

"We hit—"

"You killed somebody?"

"Yes—well, no—we—"

"For heaven's sake, Johnny! Calm down and tell me. Either you did or you didn't. Don't tell me you ran away from an accident!"

"No—listen, Dad, will you just hang up and get out here as fast as you can? I need help. I need help bad. Just get out here!"

"Okay, son I'll try and make that hot rod of yours go—"

"It's shot, Dad—it won't run. Call Mr. Hayden. Use his car."

"All right. Where are you?"

"I'm calling from a farmhouse on Garner Road — Frank William's place. He's a farmer. You know that back road where—?"

"I know. Where did you have the trouble? Where's the car?"

"At the bend about two miles from Storm Lake. That's where it—it happened. Joan and I'll go back there and wait."

"Stay where you are—we'll pick you up."

"No Dad! I didn't tell these people what happened. We'll wait near the car."

"All right, anything you say. I'll make it as fast as I can."

Ten minutes later, Sam Carter was sitting beside Lee Hayden as the latter pointed his Chevrolet toward Storm Lake. "Damn fool kids!" Lee muttered. "Why didn't you find out what happened? They may have killed somebody. Probably did. The least he could have done was tell you."

"Let's just get there and find out," Sam said with tightness in his voice.

They went into Garner Road from the south end and Lee drove slowly along the ruts and chuckholes. "Why in tarnation did they pick a road like this?"

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"It probably looked pretty good to them."

"I wonder how good it looks now?"

"Can't you drive a little faster?"

"And break a spring? I'm doing the best I can."

Sam held his impatience in check until the headlights picked out the rear end of the Packard. It stood squarely in the middle of the road.

"Doesn't look as though there's any damage," Lee said.

"We can't see the front end yet."

Lee pulled up fifty feet back and the two men got out. There was a flash of white and the two young people appeared from some bushes by the roadside. Joan, a pretty little brunette, looked ethereal in her white party dress—out of place in spike-heel pumps on this lonely country road. Johnny Carter's handsome young face was drawn and pale.

"What were you two hiding from?" Lee demanded.

Sam asked, "What's wrong here? There's no other car."

"It wasn't a crackup, Dad. It's around in front. Come on. Joany—you stay here."

"I—I feel a litle weak. I'll get into the Chevy."

Johnny helped her in and closed the door. Then he turned and said, "Come on." As they walked around the Packard, he added, "Now brace yourselves. You're going to see something you never saw before in your lives."

They rounded the car and stood for a moment. Then Johnny snapped on the Packard's headlights and Lee Hayden croaked, "Great God in heaven! Is it real?"

Sam Carter felt a chill run both ways from the center of his spine, freezing his legs and rendering him mute.

Johnny said, "We were driving along and I wasn't negligent—I swear it. Maybe not too alert, but who'd expect anyone — anything — to appear on this road without lights? Anyhow, I saw a flash of it and hit the brakes, but it was too late. I thought it was a man at first and I got out and—and actually picked it up before I realized—" He took an unconscious step backward and rubbed the sleeves of his coat as though they were covered with filth.

Still frozen, Sam Carter tried to find thoughts to describe the horrible thing. It was not more than four feet long and had a head far too large for the thin body. Its skin was green, the shades varying from deep to very

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pale. It had thin legs and two spiderlike arms ending in hands with thin delicate fingers and a thumb on either side. Its eyes were lidless and sunk into bony pockets in the round, pale green skull. There was a network of dark veins all over the body and the feet were shapeless pads with neither toes nor heels.

There was a full minute of complete silence. Then Lee Hayden got out a few words. "Is—is it dead?"

"It's dead all right," Johnny said. "When I first came around the car—after I hit it—the big veins were pulsing—you could see its blood—or whatever's in there, moving through. Then they got slower and stopped altogether."

"That blue light the boys saw," Sam muttered. "It *was* a space ship this time."

Lee Hayden, though his face was still filled with loathing, seemed to have recovered somewhat. "This one must have wandered away. Never saw a car before. Didn't know there was any danger."

"Probably attracted by the headlights—held like a moth."

Johnny said, "It's ugly right enough, but it looks kind of pathetic, too—lying there dead. Never knew what hit it."

Sam came out of his shock. "One of us had better go for the sheriff. You go, Johnny. Take the Chevy and drop Joan off at home."

"Okay." The boy turned away.

Lee Hayden had been staring at the hideous thing and a calculating light was now dawning in his eyes. "Wait a minute, Johnny." Lee raised his eyes to Sam Carter. "You realize what this means?"

"I realize that—"

"This is something from outer space, man! An—an extraterrestial, they call it, that came down to earth in a ship and—and here it it."

Sam was puzzled. "I can see it."

"Right. And you and I—the four of us—are the only ones on earth who know about it."

"Joany doesn't," Johnny said. "I don't think she saw it when we hit it, and after I looked I wouldn't let her go near the front end. I was afraid it would make her sick."

Lee Hayden's eyes glowed. "Good. Smart boy! Then there's just the three of us who know."

Sam Carter frowned at his friend. "What are you driving at, Lee?"

"Just this—there's money

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in this thing, Sam! Loads of money! If it's handled right. But we can't go off half-cocked."

"I'm afraid I don't get you—"

"Use your head! If we call the sheriff and everybody finds out, then we've lost it. There'll be photographers and reporters and the knowledge will be public property."

"You mean keep it quiet?" Johnny asked. "Unless we bury it somewhere and forget about it, the public's bound to find out."

"Of course—we want them to. But in the right way. Not until we've thought it over and figured the best way to exploit it. Get what I mean? How would a showman handle this? How would Barnum have done it? Call in the police and give it to the public in exchange for a lot of publicity and no money? Use your heads—both of you!"

Sam said, "No, Lee! We've got no right! This is serious. This may be an invasion of some kind. We've got to be public-spirited and the hell with the money."

Johnny said, "If we knew Russia was going to attack us tomorrow would we have any right to sell the information to Washington?"

"The boy's right, Lee. We can't fool around with a thing as big as this."

"The hell we can't. This is no invasion and you both know it. It's a chance to make more money than any of us ever saw."

"It's not right, Lee."

"Why not? We aren't going to withhold anything. I say, just take it easy and don't rush into anything with our mouths wide open and spouting information. Twenty-four hours is all we'll need. I'll go to Sioux City and get the thing lined up right. Get a contract with the people who know how to exploit a thing like this if we can't figure out how to do it ourselves."

"But in the meantime, what if—?"

"Twenty-four hours won't make any difference, I tell you! And in that length of time we can arrange a setup to make fortunes. Sam—don't you want the kids to start out life with a real bankroll? Do you want them to struggle along the way you and I had to? In one day, we can set them up for life—and ourselves too—and without hurting a soul. It's your obligation, Sam. Can't you see it?"

Lee Hayden argued on. After a while, Johnny Carter stopped voicing objections

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and watched his father, evidently ready to go in either direction Sam decided. The father looked at the son and misinterpreted his manner and expression. He thought, will the boy hold it against me if I deprive him of this opportunity? Do I have a right to deprive him? Possibly Lee is right. Either way, the country will know—the government will be alerted. He turned to Lee Hayden and asked, "How do you think we should go about it?"

Hayden's eyes brightened. "I knew you'd see it my way. Now, I'll tell you what we'll do. You and Johnny take the thing home and hide it in your basement. Yours is best because there are only the two of you. I couldn't hide a fly speck in my place that my wife wouldn't find."

"What about Joan?" Johnny asked. "She didn't see this thing but she knows something happened. She'll ask questions."

"You leave my daughter to me. Joan will do as I say—for a while at least. Now, let's get going."

Johnny went back to the Hayden's Chevrolet, turned it laboriously around and headed for home with Joan beside him. Gripping the wheel, he grimly staved off her questions, stopping them finally, with, "Ask your father when he gets home. He'll tell you about it."

Joan Hayden crouched miserably in her seat. A fine end, this was, to a romantic date.

After the Chevrolet disappeared, Lee Hayden said, "Well, we might as well get it over with. You take the arms—I'll grab the feet here, and we'll drop it in the back seat."

Sam Carter shuddered. "I'll open the trunk. I wouldn't want to drive back with this thing in the seat behind me—even if it is dead." He went back and opened the trunk and returned to lift his share of the burden. There was a loathsome, cold, damp softness to the skin that made him shudder as he gripped the arms. There was little weight, however, and they soon had the monstrosity locked in the trunk.

As Sam drove, quiet and sober, Lee Hayden sat staring ahead, leaning tensely forward, as though already reaching for the money that would soon be his. He said, "Look, Sam—this thing is big—real big."

"You said that before."

"But now I get to thinking and I realize the potential.

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The hell with stopping at Sioux City. I'll head straight to Chicago. And we don't have to ring anyone else in on it."

"Better be careful. We don't know anything about exploitation."

"The newspaper men take care of that after they see the thing. They'll give us all the publicity we need. We'll rent a theater in Chicago and do some advertising—"

"They'll laugh at us. They'll think it's a racket."

"Of course they will—until they see it. Until the newspaper men see it. Then we'll have to rent the stadium."

"I hope we don't get into any trouble with the government over this thing."

"How can we?" We aren't violating any law. And who can blame us for trying to make a dollar? When they ask us about it we'll tell them."

"They'll nail us for not reporting an accident," Sam said, smiling weakly.

Lee Hayden laughed and slapped his friend on the shoulder. "Good man! I knew you'd be smart and see it my way. What right have we got to turn down money?"

Johnny was home and waiting when they got there. Sam drove straight into the garage. Johnny said, "I was trying to figure what we'd do with the thing, Dad, so I emptied the deep freeze in the basement. I put everything I could into the refrigerator in the kitchen and just left the rest of the stuff out."

"Good boy," Lee said heartily. "That's using your head. What's a little spoiled food when we're on the cash end of a deal like this?"

They carried the feather-light, green body to the basement under cover of the darkness and laid it to rest in the freezer. Then they went up into the kitchen where Sam made coffee and they sat planning their strategy.

"Don't think we ought to rush into this thing," Lee Hayden said. "We've got to be kind of careful."

This surprised Sam Carter. "How come? You were in such an all-fired hurry—"

"But there's angles. It's practically morning, and if I go kiting off to Chicago after being out all night, the wife's going to start wondering. There'll be rumors all over town. I've got to talk to that girl of mine, too. Keep her quiet until we get this thing rolling."

Lee Hayden had changed. With something to get his teeth into, he'd assumed leadership in an impressive man-

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ner. Sam said, "All right. Whatever you say, but I'm still a little nervous about—"

"Now take it easy! I tell you everything's going to be all right. You two get some sleep and I'll give you a ring."

Sam Carter went to bed, but sleep would not come. He lay staring at the ceiling, thinking of the horror that rested in the deep freeze in the basement. The fact that the thing was dead brought little comfort. He had been lying wide-eyed for perhaps an hour, when he heard the noise. He stiffened, strained his ears. The sound came again. No doubt now. From the basement. He got up and clawed for the lamp at his beside when the door opened. The light snapped on to reveal Johnny's pale, frightened face.

They stared at each other for a long moment. Then Johnny whispered. "Did you hear it, Dad? From downstairs. It—"

"Lee, I'll bet. He couldn't sleep and came back for another look. Let's go see."

"He wouldn't do that. You know what I think? It wasn't dead! The thing was still alive and now it's come to and it's prowling the basement. What are we going to do, Dad? We don't know anything about it. Maybe it's dangerous—deadly—"

"Now don't get excited. I'm sure it's Lee." Sam picked up the phone and dialed. They waited tensely as another of the rattling sounds came from the basement. Then Lee Hayden's voice. "Hello."

"Lee—Lee, for God's sake. Get over here! There's trouble. The thing's come alive."

Lee Hayden didn't even bother to answer. Sam heard the phone slammed down. He pulled on his pants and had just finished with his shoes when the front gate slammed and there were running footsteps on the walk. They met Lee as he came in the front door. "What's wrong?" he snapped. "What's happened?"

"There's someone down there," Johnny said. "We thought maybe it was you—"

"What would I be doing down there? Why didn't you go find out?"

"Then maybe—maybe the thing came alive."

"And you didn't check? Do you realize what it would cost us if it got away?"

"But it may be dangerous."

"Nonsense, but if it did come to, it's ten times more valuable." Lee was already at the basement door. He went fearlessly down the steps, Sam and Johnny Carter fol-

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lowing behind with more caution.

At the foot of the stairs, Lee stopped dead. He pointed. The freezer cover was lifted back. Lee rushed across and looked in. "It's empty," he moaned. "It got away."

He turned toward the open door leading into the backyard. "Come on—we've got to catch it—got to get it back!" He dived out into the darkness. Sam, following, snatched a flashlight off its hook by the door.

In the yard, he bumped hard into Lee Hayden who had stopped suddenly. "The garage," Lee whispered hoarsely. "The side door. It's open!"

Sam flashed the light and the three of them walked softly forward. "Maybe somebody's just trying to steal it," Johnny whispered

Then Sam snapped on the garage light and no one did any more talking.

There were six of the things present. Two of them were carrying the body from the freezer. The other four carried peculiar tubes in their hands, somewhat smaller than Sam's flashlight. And if the creatures were repulsive when dead, they were bone-chilling when alive and functioning. Their cold, lidless eyes bored into the three men and Sam muttered, "We're done for!"

The creatures regarded them with no fear whatever. There appeared to be contempt in the leering faces, and the tone of the odd, bird-like chirping with which they apparently communicated with each other, heightened Sam's feeling that they were voicing this same contempt. But something told him they were deadly. Sam breathed, "Don't move! For God's sake, stand where you are! Don't antagonize them!" He had the same feeling he'd have had at facing a den of rattle-snakes; the feeling that one false move would bring out striking fangs.

The creatures seemed to discuss the three among themselves, and Sam was sure the weird squeakings that punctuated the chirpings was their form of laughter. But they made no move to kill, and Sam began to hope they were harmless.

Then he was speedily disabused of the idea. In a concerted move, they turned their small tubes on the front of the Packard. There was no sound, no heat as from a high frequency ray, only the soft sound of metal being bent and twisted by a hand gloved

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in velvet. And the three men stared as the front end of the Packard twisted and writhed itself into the same disorder that would have resulted from smashing headlong into a brick wall. Then the truth dawned on Sam—or what appeared to be the truth. "They aren't mad at us. They think the Packard did it; they're punishing the car for killing their comrade. Don't you get it?"

The creature paid no attention to the words. That emboldened Lee. He said "I think you're right. It's incredible! How can they be smart enough to invent and use space ships, and yet not know the car isn't responsible for the killing?"

"I don't know. Shall we back out of here? Make a break for it?"

"I think we'd better stay just as we are," Lee said promptly.

This last proved good advice because, after demolishing the front end of the car to their satisfaction, the creatures squealed and chirped for a while, evidently voicing their satisfaction, and then trooped out into the darkness. As they moved past, each of them leered at the frozen three, squeaked a nerve-wracking farewell, and the troop was gone, carrying its dead with it.

An explosive sigh from Lee Hayden broke the silence. "I've got a hunch we were damn lucky," he said. "Damn lucky to still be alive."

"How do you think they found the house?" Johhny asked.

Sam said, "I don't know and I don't care. I'm just glad they're gone."

"We've got to do something about this," Lee Hayden said with virtuous indignation. "Alert the police. The village —the whole nation may be in danger. It's up to us to do something about it!"

Sam didn't bother to call Lee's attention to his sudden reversal. It didn't seem important now. The only important thing was to spread the word.

They left the garage and headed for the house. But, halfway up the walk, the sound of an approaching car stopped them. The car pulled up in front of the house and two uniformed men got out.

"It's the State Troopers," Johnny shouted. They must have got wind of it already!"

The Troopers approached swiftly. Lee began, "Officers —" but one of them cut him off.

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"We're looking for a Mr. Sam Carter. We got this address and—"

"I'm Mr. Carter," Sam said. "There's something—"

"I'll do the talking. You have a son?"

"Of course. This is my son —John Carter—."

"You have a Packard roadster?"

"Yes."

"Was your son driving it on Garner Road last night? Near the farm of Frank Williams?"

"Why, yes. He took his girl to a dance at Storm Lake and—"

"We know all about that. How do you suppose we traced you down?"

"But why—?"

The Trooper scowled. "Did you think the body would not be found?"

"But you couldn't have—what body—?"

The second trooper snorted in disgust. "Frank William's body. Where a car smashed him into a tree and killed him. From what we can find out, no one used that road last night except your son."

Johnny stepped forward. "You mean Frank Williams was found killed on the road?"

"That's right. Now we may be wrong of course. But the car that hit him will be pretty well smashed up. If you'd let us take a thorough look at your car—"

Sam Carter said, "But this is absurd, officer. There was —there was—"

"Look, all we have to do is check your car. If it's not damaged—"

It dawned on Sam, now, what the green intruders had been up to—what they'd accomplished. They'd killed Williams—set the scene—arranged the colossal frameup. He looked at Lee Hayden and said, "We thought they were mad at the car! We thought—."

The trooper said, "What are you talking about, mister?"

"Well, there was this little green man from Mars or somewhere, and Johnny hit him when—" Sam stopped talking when he saw the look on the trooper's face. Then he knew how foolish it would sound—how utterly unbelievable. He looked back at Lee Hayden and began to laugh. But there was no mirth in the sound. Only fear—and hopelessness.

THE END

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(Cont. from page 15)

"It had an eye that wasn't an eye at all but that kept looking around. I quazed that it was searching and I stayed hidden all the while. It breathed in the air and lapped up the water and caught the rain. It scooped up sand and mud and spoke in a continuous chatter that—"

"Spoke?" L'Jork repeated. "To whom?"

"I don't know. I couldn't quaze that. I couldn't even quaze what it was saying in its silent, humming voice. But I was watching from the bushes when a herola came trotting up and paused to sniff the Thing. Suddenly there was an opening in the side and—"

"And the herola went in?" the Exemplar asked cagily.

"Of course not. Herolas are too cautious to do anything like that. A puff of green air floated out and the herola fell still. An arm, thin like the shaft of a spear, appeared through the opening and pulled the animal in. Three sleeps later I found the

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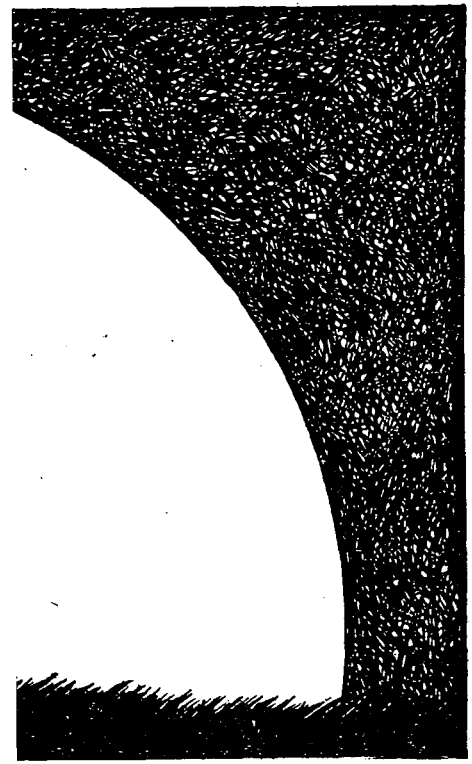

herola outside again—dead. The Thing That Trapped had finally quit chattering. I could quaze it was lifeless. I hurled it into the Sorrowing Sea."

"It was small enough for you to hurl?"

"Yes, Exemplar."

"Then it couldn't have trapped you. How about the forty-one Presences in the Upper Endlessness—could *they* trap one of us?"

"One is large enough to trap many of us."

K'Tawa, who had been considering snatching a few moments of Contemplation, straightened alertly and looked around. All the Meditators were stirring on their Thinking Slabs. They had quazed *something*. And now L'Jork and K'Tawa themselves were quazing it—a lynko.

The small, friendly animal, had entered the village clearing. Sauntering in its upright attitude, the furry creature dragged its tail behind as it foraged about the huts. And each Meditator rose and touched his quazehorn respectfully as it passed.

K'Tawa quazed Zu-Bach's feeling of insignificance. The animal had received the consideration from the Meditators that he had been denied. But, the Old One realized, Zu-Bach would eventually learn that the Code of Kinship extended sympathetically to the presumptuous lynko because, unlike the other creatures, it walked upright.

The Exemplar bestowed his respectful gesture on the lynko and turned his back to Zu-Bach. "Very interesting," he said, heading for his hut, "—your Thing That Traps and the soaring Presences. I'm sure they will provide me with subject matter for Contemplation through many Withdrawals."

Frustrated, Zu-Bach gripped his spear and stormed off.

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L'Jork paused, turned and nodded understandingly at the Old One. "Keep your quazehorn on the boy, K'Tawa. He's impulsive. Needs guidance if we ever expect to get him started on Ascendancy."

The Old One indicated his agreement, then trailed after Zu-Bach. He overtook his lesser kin at the edge of the forest.

"For all they care," Zu-Bach said, sulking, "one of the Presences could come down and trap the entire village!"

"The first step toward Withdrawal," K'Tawa began soothingly, "is to learn Forced Disassociation with the Material. Next—"

"Oh, lynko dung!" the other exclaimed.

Then, above the swish of softly-falling rain, above the Ceaseless Thunder's roar, a great howling rent the sky somewhere near the sea. And a queer, hazelike glow of prolonged Lightning limned the bellies of the Perpetual Clouds with an angry, pink cast.

"They're coming down!"

"There!" Zu-Bach shouted. "They're coming down!"

He started to race off toward the coast. But K'Tawa exercised the Prerogative of Undeniable Seniority.

"Stay!" he ordered. "It is almost sleep period. We will have nothing more to do with the Presences 'til after firstmeal."

Shoulders sagging submissively, Zu-Bach followed him back toward their hut. And the Old One foretasted the pleasant period of Meditation he would enjoy before sleep came.

* * *

COLONEL O'Brien stood before the still-closed outer hatch, slipped the plastic respirahood over his head and secured its wrap-around oxygen cylinder to his waist. Then he reached under the transparent bag to reposition his throat mike and earphone.

"Testing," he said softly.

And the comsystem grated with Commander Green's instant acknowledgement from the other side of the air lock.

Beside the Colonel, Wastrom raised his own hood toward his flushed, tense face, then paused. "What if all that carbon dioxide comes up under this bag?"

The Colonel constrained himself from complaining that O'Briens weren't ordinarily *that* lucky. "Venus' atmosphere is eighty-five per cent carbon dioxide," he recited tonelessly. "CO_2 is heavier than the stuff we breathe. It'll stay down. The oxygen, being lighter, will stay up in the hood."

"I see," Wastrom said, as though he hadn't often been reassured during training.

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O'Brien reached for the hatch handle. "Ready?"

"Can't we wear space suits—for protection against infection?"

O'Brien closed his eyes in momentary pursuit of fortitude. "One: It wasn't planned that way. We have no portable air-conditioning units. You'd swear you were in an oven. Two: Tymaroff showed conclusively just a couple of years back that a specific relationship has to exist between pathogen and host. That relationship has to be developed through thousands of years of evolution, not just during a few hours' exposure. In short, the chance of infection from a Venusian bug is nil. Ready?"

Reluctantly, Wastrom positioned his mike, introducing his voice into the comsystem. "You think twelve hours was long enough for the ground to cool off from the Spica's braking—"

"Look, Wastro—we've got thirty-six supply capsules out there that survived entry. They're waiting to be assembled into U.S. Venus Base. We have only one week before Train Beta arrives. Either—"

"I'm ready," Wastrom broke in, shrugging his adequate shoulders.

Green's voice sifted through the Colonel's earphone. "How about me helping you on pickup, Scott?"

"No. We'll stick to the planned procedure. You and Green will monitor the scope and match our blips with the capsule blips."

O'BRIEN jerked on the handle and the hatch swung open on a dismal panorama of shadows and deeper shadows. The hot, humid stuff that passed for atmosphere enfolded him like a wet blanket just taken out of an oven.

Outside, it was twilight of the stormiest day he had ever seen on Earth. The drenched ground and, in the distance the rain-slicked forest still bore evidence of the torrential downpour that had just turned the Jason capsule into a deafening drumhead. Concussionlike thunder roared from the cloud-packed megaphone of the sky and O'Brien counted a half-dozen bolts lashing the ground simultaneously.

He swung out the boom, fastened the nylon line's harness around his chest and stepped out of the hatch. Down he went alongside one hundred and fifty towering feet of the Argo, past the Procyon IV-B stage, past the Spica fin-and-braking assembly.

He landed on the slippery but surprisingly firm ground, squirmed out of the harness and gave it a tug to start it on its

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way up. Then he went around the Argo and checked the lightning arrester for proper grounding where it had harpooned into the soil—insurance against having the Procyon's load of solid fuel ignited by a bolt.

"Coming, Wastrom?" he asked. When there was no answer, he called out again, then looked up.

The electronicist was on his way down. But he was out of contact. His earphone could readily be seen dangling by his waist.

"Trouble?" Yardley inquired over the radio.

"Nothing unusual. Wastrom just lost his earphone."

Yardley continued: "I'm sorry about all this, Colonel. And I feel guilty since—well, he and I represent the civilian side of this outfit."

"I understand how you feel, Frank. And thanks."

"No," the nuclear-tech insisted. "I want to make up for it. I'm checked out on most of his chores. If you'd like to shift any of them on my shoulder—well, it's sturdier than it looks."

"We'll see. When its sinks in that we made it over safely and nothing's going to happen, he may come around."

O'Brien lifted his hood, cupped his hands around his mouth and shouted, "Wastrom damn it! Fix your earphone!"

GREEN didn't have to direct them to the first supply cap in the Recovery Area. Clinging to a hillside, its orange 'chute vividly contrasted the olive-gray grass ("moss" would have been a better word, as far as O'Brien was concerned) on which it lay.

Explosive bolts popped and the conical capsule flared open on a six-legged Bondley Terrain Walker, top speed twenty m.p.h. with its three hundred kilowatt-hour Reinhold battery.

That, together with coaching from the Jason's observation-command gallery, brought them swiftly if not smoothly to the next two capsules. There they acquired a Mark VI Modified Electrical Crane-Tractor and a train of 'cat-tread dollies.

Within several hours, O'Brien, having counted upon but received little help from Wastrom, had loaded the train with the contents of twelve supply caps.

Securing the last load to the final dolly, he leaned back against one of the Terrain Walker's legs. He held his breath while he removed the respira-hood and sleeved perspiration off his face.

Miserly, he inventoried his acquisitions. They included such indispensable items as a Collard Mark IV nuclear powerplant with accessory battery chargers,

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Del Rouad transmitter-receiver keyed in with the orbiting Com-Pac relay station, inflatable Mannerheim Home Environment Igloo and a Westinghouse Oxyaccumulator-Compressor.

Those—together with the field laboratory equipment, the main consignment of O_2 cylinders, Spica stage fuel containers, noncencentrated food supply and other useful if not essential articles—were beginning to make the place seem more like home by the minute.

"Let's go back," Wastrom urged, fidgeting with the Terrain Walker's tiller.

But Yardley's voice vibrated in the earphones. "Your next cap is only a couple hundred yards off—beyond that hill."

"We're loaded," the Colonel explained, heading for his tractor. "Anyway, the rest of the stuff'll keep. Five more capsules and we'll have one complete set of everything."

"We've come out a lot better than I hoped we would," Green said. "I'm sold on this system—a supply train in two sections, one half a duplicate of the other."

"Every piece of equipment has its backup."

"We were lucky too. Of the four caps lost in entry, no two were alike. So we're not completely out of anything."

O'Brien started up the tractor but paused to reach under his hood and wipe more perspiration from his forehead. Actually, there was nothing to worry about. Train Beta was due in another week. It was a duplicate of Train Alpha. If the first mission had succeeded, Beta would establish a second base. If not, the backup train would contribute its resources to the Alpha effort.

Then in another week Train Gamma would arrive, bringing its missile crews and the first consignment of interplanetary weapons with their ace-in-the-hole warheads. Indeed, there was nothing leisurely or stinting about the operation.

SCOTT—GREEN again. Our scope just lost the signal from the farthest capsule down the line."

"Which one is that? What's its cargo?"

There was a pause while Green checked the master sheet. "Power tools, medical supplies. You figure something happened to the cap?"

"No. It's about time at least one minor piece of equipment failed. I'm thankful it was just a Here-I-Am transmitter."

Falling in behind the Terrain Walker, O'Brien sent the tractor crawling toward the Argo. Then he noticed Wastrom was nervously securing his belt around

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his neck, pinching in folds of the hood.

"What's that supposed to be for?" the Colonel asked.

"That damned carbon dioxide—I can smell it!" the electronicist cried. "It's poisoning me!"

O'Brien had no comment. What could he say when he was beginning to suspect the other was just indulging his eagerness to grumble? Wastrom had certainly been sufficiently filled in on the nonpoisonous nature of Venus' carbon dioxide and nitrogen. He couldn't have forgotten that the only danger the atmosphere posed was one of suffocation as a result of oxygen starvation.

"Colonel, this is Yardley," the earphone hummed. "Those caps we haven't recovered yet—a little water won't hurt them, will it?"

"Of course not. Why?"

"We just lost our screen blip from the *second* farthest capsule—the one with the standby long-range radio gear."

O'Brien frowned. "I won't buy another Here-I-Am failure."

"I don't think you have to. You see, the scope shows the far end of the capsule line stretching out across the beach of a bay. There the capsules almost missed land."

Green came in. "So we figure transmission is being grounded out by a rising tide."

"Sounds logical. We'll check it out tomorrow. Our first concern is blowing up the Mannerheim Igloo and hooking up the Del Rouad. Then we'll be able to contact EarthOrb Station next time the ComPac relay swings into position."

The Terrain Walker and tractor crested a hill and O'Brien felt somewhat more at ease at the sight of the Argo five miles off—proud and competent as it reared cloudward and fitfully reflected the brilliance of distant lightning.

Then his brow furrowed in belated consideration of the lost capsule signals. Venus wasn't *supposed* to have any tidal action! But then, that didn't rule out the possibility that persistent winds might occasionally pile up water upon the beaches.

III

HIS limbs protesting unaccustomed travel, K'Tawa lowered himself on his haunches but resisted lapsing into Meditation. Instead he watched Zu-Bach cautiously approach the next descended Presence.

Laying down his spear, the latter knelt beside the shining object and directed his quaze-horn at its various portions. Then he paused and glanced back at the Old One.

"*I* don't quaze any danger,"

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K'Tawa assured. "And it certainly isn't intended for Trapping."

Zu-Bach pounced upon the Presence, raised its glistening hulk over his head and hurled it to the ground. He retrieved it and smashed it against a boulder. Then he dunked it in the restless sea, hauled it out again and began beating on it with his spear.

K'Tawa smiled his approval. The youngster appeared to be enjoying himself immensely. To say the least, he *was* working off a goodly amount of energy. Maybe he was getting all the Materialistic inclination out of his system at one time.

Zu-Bach pushed eagerly on to the next hated Presence and K'Tawa trailed along. Then, as the other reached incautiously down for the thing, the Old One shouted a warning.

He went over, closed his eyes to avail himself of the concentration that Visual Withdrawal would provide, and carefully quazed the object with a meticulous circular motion of his horn.

"There's much danger here," he disclosed. "Tremendous force and power—something like the Hot Tongues in the Pre-Meditation Ceremony. I quaze, perhaps, a fierce and deadly noise."

It was all in the realm of only extreme possibility. But he had decided to put it on a bit thick and see if he couldn't humble Zu-Bach with an appreciation of the inadequacy of his own quaze-horn.

"Also," he went on, "I see maybe a great angry cloud billowing into the Upper Endlessness, taking with it part of Onlyland and leaving another bay to embrace the Sorrowing Sea."

Warily, Zu-Bach retreated from the Presence. But, on second thought, he reached out and snapped off its long, thin horn. The thing's silent voice went dead and he grunted in satisfaction.

K'Tawa regarded the Presence. It *was* dangerous. So he decided not to move it into the cave where he had hidden the other two. One he had saved because he had quazed its ability to talk with other remote Presences in the Upper Endlessness. The other he had rescued on impulse from Zu-Bach's avid grip. Its contents had been queer and useless—only stale air, all pressed together. But he had vaguely quazed that a beneficial purpose might be found for it.

The next fallen Presence was quite harmless and the Old One watched Zu-Bach attack it with keen enthusiasm. The boy had accepted it as a challenge, since it was twice the size of the last one and since he could lift it only with great effort.

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K'Tawa quazed ahead to the distant great Presence that stood upright and conveyed its impression of lurking power and clever ability. And he puzzled again over the four little, living Presences. There, too, he detected treachery and cunning, hate and possessiveness. Zu-Bach had not yet quazed the minor, soft Presences that moved around. When he did, though, there was no doubt that he would be furious. K'Tawa knew him that well.

Thinking next about the concept of more things in the Upper Endlessness, the Old One, without realizing it, surrendered to the welling urge for Cogitative Withdrawal.

WAS it normal, he wondered, for Presences to exist up there? IF there were many more, as suggested by the total impression he got from the landed things, they must be coming from *somewhere*. But how could there be a *somewhere* in the Endlessness of Perpetual Clouds?

Then, from the depth of his mind, an obscure ancestral recollection incidentally offered the suggestion that the Clouds might not be Perpetual. Nor might they extend throughout the Endlessness.

Perplexed, K'Tawa asked himself the inescapable question: If the Clouds were not everywhere up there, then *what* existed in the Cloudlessness?

The answer came like a whispered voice from the long-dead past: Blackness. And in that Blackness—

"K'Tawa, let's move on. I've exhausted all the possibilities of destruction with *this* Presence."

The Old One snapped from Withdrawal and stared irately at his relative. At times, he reflected, it required no small degree of fortitude and restraint to pay due respect to the Code of Kinship. There he had been—on the threshold of Phase Eight, perhaps even hopeful of glimpsing the Great Debacle. But now—well, he felt like exclaiming, as Zu-Bach would have done under comparably disappointing circumstances, "Oh, lunko dung!"

The time eventually came, as K'Tawa had quazed it soon would, when Zu-Bach had run out of Presences to destroy. But, by then, he had gotten a quazescent of the four minor, living Presences.

Amused, the Old One had watched him drop the shattered remains of the last provocative thing and turn toward the towering, glistening object in the distance. Now, tense and alert, he was sweeping his horn imperceptibly from side to side, finely sorting out details of what lay ahead. Wedged around the

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tip of his upthrust spear was a battered remnant of the last Presence he had destroyed. But it was obvious that he didn't intend to dislodge it. Rather, he was displaying it proudly as a symbol of triumph, as he was the other piece of the Presence he had wrapped around his wrist.

"K'Tawa—"

"I know. Four *living* Presences."

"Queer things—like the lynko. But without tails."

"What else do you quaze about them?"

"Hate—plenty of hate. Scorn too. And treachery and greed and watchfulness."

K'Tawa nodded commendingly. Zu-Bach seemed to be developing his talents a bit more fully now. "Can you quaze what must be done?"

"Yes." The other's grip tightened on his spear. "They must be destroyed. They will do more than Trap. If they get the chance, they will—kill?"

"I'm afraid so. At first I was confused. There are obviously similarities of a sort between them and us—such as the fact that they breathe, even though it *is* only stale air. But the similarities are only Physical. Spiritually, we have no common ground—as far as I can see. They are totally Materialistic."

"There is no relationship then?"

"None whatever. When you stop to think about it, how could there be when they come from the Endlessness?"

K'Tawa rose from his haunches, ignoring the complaints from his tired muscles. "Onlyland will be much the better when they are removed, together with all their lifeless Presences."

"They shall be removed," Zu-Bach vowed.

"But you must be careful. There *is* danger of a sort. However, I'll come along and quaze it out for you."

RATHER than approach directly, Zu-Bach swung over to the forest. And the Old One smiled in satisfaction over the other's prudence. It perhaps signified the proximity of long-awaited maturity.

"They *are* evil Presences, aren't they, K'Tawa?"

"Yes. I can quaze anxious fear and wariness, distrust and malice. Feel no compunction about destroying them, boy. Not when one of them wouldn't hesitate to destroy another, if it meant personal gain. One is particularly like that."

"And the other three?"

"I'd say they too are of the same nature—by extension. Let's look at it this way: The Meditators Meditate while we let you and the other Prephasers

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do all the routine work. It must be the same with the four intruding Presences. Three of them have more important jobs to do. The fourth we quaze as particularly evil, I suppose, because he will do whatever killing must be done."

Directing his horn at the back of Zu-Bach's head while they walked, K'Tawa sensed surging anticipation. As a matter of fact, he was inclined to interpret it as a lust for the fascinating excitement that lay ahead.

Ordinarily, the Old One would have been somewhat concerned over Zu-Bach's purely Materialistic preoccupation. But expediency had to be served. And his young kin would only be doing what *must* be done if Spiritual Ascendancy was to be preserved as a way of life.

That much he could quaze clearly.

* * *

A HUNDRED feet in diameter, compartmented by flexible partitions and rising twenty feet above the Venusian surface, the Mannerheim Igloo rustled its plastic shell. Ironing out the final wrinkles, it strove for rigidity. Electrical energy for its oxyaccumulator-compressor and air-conditioners flowed smoothly from the Collard nuclear powerplant Yardley had set up in a conveniently-located coastal cave.

Outside, the tail end of a brisk shower drummed against the transparent dome. Inside, O'Brien and Green, each with an arm wrapped around Yardley's neck, tried a second chorus of "Home Sweet Home." The song ended on a sour but exuberant note and Yardley went over to where Wastrom stood staring out at the bleak landscape.

"Come on, get with it, Calvin!" Yardley slapped him on the back. "We've got our toehold!"

Wastrom's stare was unresponsive as he moved several feet away along the inner curvature of the plastic wall.

Disconcerted, Yardley returned to the two officers.

"Let him sulk," Commander Green advised.

"We're well over the hump," O'Brien added. "Even if he doesn't lift a finger, we've got it made."

"As long as we don't run into any complications with the electronic gear," Yardley reminded. "Some of that stuff would be pretty complicated to anybody but Wastrom."

"It's preset," Green said. "All we have to do is uncrate it."

O'Brien glanced around, smugly surveying the now stiffly partitioned interior of the Igloo. Being inside—without a respirahood, with eighty-degree air bringing relief from the hu-

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mid hothouse out there, with the reassuring *chug-swish* of the oxyaccumulator pulsing in his ears—brought an unanticipated pleasantness.

Within a few days, he reminded himself, the Igloo wouldn't be so starkly bare. There would be bunks, the soft lights of a humming communications-command section seeping through transparent partitions, a galley redolent with the odors of familiar foods—even shower stalls. And it would make little difference that the water being sucked out of the ocean would be carbonated.

The colonel cast a solicitous glance at Wastrom, then went over. "What's the trouble, Calvin? Anything I can do?"

"No." The other surveyed his hands. "I don't suppose so."

But when O'Brien started to walk away, Wastrom added hastily, "It's just that—I don't know. Maybe sometimes you expect too much of yourself. I guess it's like Green said: They must have done a lousy job psyching me out."

O'Brien half turned from the pathetic sight of a robust man capitulating to unreasonable fear. "You'll be okay," he said, but not with conviction.

"But it *isn't* right to go streaking off across God's universe!" Wastrom's voice rose abruptly. "We're challenging—"

He paused, forcibly restored his composure and exposed his hands once more to his gaze. "Colonel, I'm the youngest man in this crew. Yardley's almost forty-five. But I don't suppose I have half his guts."

"None of us is as calm as he appears."

"But I ought to be the one least concerned. I don't even have a family, like Yardley and Green do."

"Look at it this way: We're here. Everything's working out. No complications. And getting back Earthside is going to be a lot easier."

"*If* we get back."

"All right, Calvin—why do you imagine we might not?"

WASTROM motioned outside the transparent shell. In the distance, O'Brien recognized what the probe data processors had dubbed a "venusow" sloshing through a swamp.

"That's why," Wastrom went on softly. "That's life—Venusian life. It's a lot like ours. It exists and moves around and breathes. But it *can't* do those things because there's no oxygen in the air. It—"

"Animal life on Venus," O'Brien recited, his patience extended, "is adapted to a biochemistry in which nitrogen replaces oxygen in the energy relations of the organism. Carbon

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dioxide comes into the picture too. The nitrogen is oxidized to nitrate and carbon-nitrogen bonds are formed."

"That's just the point! Life *is* possible. Animals *can* live here —not only the ones we know about, but perhaps ones of a higher order too!" Wastrom's eyes were restless again and his voice unsteady.

Green shouted from across the large compartment, "Time to get to work." He brought over respirahoods and oxygen tanks.

YARDLEY covered the stacks of supplies with plastic tarps while Commander Green completed the network of protective lightning arresters. O'Brien, with Wastrom close by so he could keep an eye on him, had the Del Rouad transceiver cabinet slung under the tractor's crane and was moving it into position beside the Igloo.

He paused and adjusted his throat microphone. "Yardley, you'd better start staking down our dome before the next storm comes up."

He sent the tractor creeping forward with its load, but paused again and called directly down to Wastrom, "Move that Walker out of the way so I can get this thing in place."

Wastrom mounted the Terrain Walker and started it up, setting the drive for reverse motion.

"Watch it!" O'Brien shouted. "You're backing into the Igloo!"

Wastrom brought the Walker to a halt and stared down over its rear legs. A footpad had become entangled in one of the Igloo's tie-down grommets.

"Well, don't just sit there!" Green admonished, coming over. Then, "Never mind, I'll free it myself."

But Wastrom had already leaped from the cab.

Instantly, Green shouted and dived out of the way as the immobilized machine clanked back to life and lurched forward.

Wastrom fell sitting in the soft mud and scurried as far from the runaway Walker as he could get. "My sleeve! It—it caught in the switch as I jumped!"

The Walker attained full speed, plopping one footpad down in front of the other. When the entangled tie-down line pulled taut, the entire Igloo fell in behind the machine in an inexorable march across the beach.

Green helplesly seized a fold of the plastic as it went by and tried to hold the inflated dome back.

Yardley raced after the Terrain Walker. But it was obvious he would never overtake it.

O'Brien swore, started up the tractor, then lost half a minute lowering the encumbering Del

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Rouad cabinet from the crane.

When he finally backed around, however, he could only sit there and watch the Walker splashing out into deeper water. A gust of wind caught the Igloo and sent it scudding ahead of the legged contraption until its tie-down line finally snapped free.

Ten minutes later it was swallowed up by a rainstorm several miles out at sea.

COMMANDER Green finally broke the silence. "Thank God for little girls and backup supply capsules."

O'Brien said, "We've got our work cut out for us now."

"What's first on the program?" Yardley asked.

Green glanced at Wastrom, who was standing sullenly off to himself. "I suppose lynching's out. In which case we can hie ourselves into the Recovery Area and retrieve the backup Igloo."

"Unless," Yardley suggested, "Colonel O'Brien wants to try to set up the Del Rouad gear *without* the Igloo so we can get a message back to EarthOrb Station."

"That's what we *should* do," the Colonel admitted, "since we've already been here twenty-four hours. But we'll try to get the standby Igloo set up first."

Wastrom came over finally, his hands spread out characteristically. "I couldn't help it. You see, the Walker's pad got—"

Green reached for the electronicist, but O'Brien caught his arm.

"Just find some place to sit down," the Commander snapped, "—and stay out of our way!"

Wastrom retreated a step, his puzzled expression half obscured by the wrinkled plastic of his respirahood. "I'm trying to be helpful, if you'll let me. I was going to suggest that we just suspend operations until we get our balance again. It's been thirty hours since we've had any sleep."

This time O'Brien had to place himself tactfully in front of Yardley, who showed indications of imminent explosion.

"I'm going after the backup Igloo," the Colonel said hastily. "Yardley, you get on the Jason's scope and guide me."

He turned to Commander Green. "Ken, I've got an idea we might be able to raise the ComPac relay station next time it orbits by if we retune the Jason's transmitter and step it up. See what you can do. Wastrom, that's in your line. Give him a hand."

Yardley and Green struck off for the Argo.

O'Brien paused to stare along the shore. Disappearance from the scope of two Here-I-Am sup-

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ply capsule signals had suggested an unstable water level. But now, as he surveyed the huge outcropping of rock a hundred yards down the beach, he could see no evidence of tidal action. The mouth of the cave in which they had set up the Collard nuclear powerplant was still several feet above the water line.

He headed for the tractor, watching first Yardley, then Green ride the constant-tension lift up to the Jason capsule's hatch. Yardley and Green—but not Wastrom.

Puzzled, he spun around. Following along, the electronicist was carrying a brick-size rock. When O'Brien stared questioningly at him, he tossed it in the air and caught it.

"I think you ought to let me retrieve the backup Igloo, Colonel," he proposed as they continued back toward the Alpha Base site. "After all, I'm the one responsible for this complication."

"We'll operate more efficiently," O'Brien pointed out, "if we stay within our assigned capacities."

THEY had reached the tractor when Green came in over the comsystem. "Wastrom, come on up here and—"

"Colonel!" Yardley's anxious voice broke through. "The supply cap signals! They've *all* disappeared from the scope!"

Perplexed, O'Brien stared first at the towering Argo, then out into the Recovery Area. Thunder rolled angrily overhead and a bolt of lightning crashed into the swamp beyond the ship. Another speared directly down at the Jason capsule. But the Argo's arrester took the full charge with no arcing.

"Check your gear, Frank," O'Brien suggested. "Maybe it's a matter of gain adjustment."

"No, it's not the gain. I'm picking up *your* blips clearly."

Then Wastrom's face froze behind its plastic hood as he stared off toward the nearby trees.

"Good God!" he shouted, his hand whitening in its grip on the stone. *"Look at that!"*

O'Brien whirled around, then fell back astonished.

Men! Naked giants! Two of them—stepping out of the forest. Great brown bodies with immense shocks of coarse, white hair and leering, grotesque faces both horrible and primitive.

The foremost, carrying a long pole with something shining and terribly familiar wrapped around its tip, loosed a roar that was finally drowned out only by a somehow mightier blast of thunder.

"They look *human!*" Wastrom exclaimed. "And that thing on the stick—it's part of a supply capsule!"

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The comsystem was overwhelmed with the startled voices of Yardley and Green, who had evidently bolted back to the outer hatch.

Covering the ground in immense strides, the nearer giant reached the first mound of supplies. He dropped his staff and scooped up a half buried boulder. Raising the rock again and again above his head, he pounded the pile of equipment into rubble.

Wastrom, crouching with O'Brien behind the tractor, hurled the stone he had been holding. It glanced off the creature's back with no apparent effect.

"What *is* it?" Yardley rasped over the comsystem.

"It's twenty feet tall if it's an inch!" Wastrom observed. "And look—it's got a *horn* growing out of its head! They both have!"

O'Brien tugged at the other's sleeve. "Let's work our way back to the Argo!"

The creature paused before a pile of neatly stacked oxygen-difluoride cylinders and an adjacent mound of diobrane tanks. He barked at his companion, who had drawn up calmly beside him. The latter barked back and they moved on from the Spica stage's reserve fuel to the Del Rouad transceiver. In three blows, the metal cabinet was shattered, its electronic viscera spilled out upon the ground.

HALF concealed behind a ridge, O'Brien and Wastrom scurried for the Argo.

The more restrained giant seized the obviously enraged one's arm and pointed at the fleeing figures. But the other shook him off, helfting a still unopened supply capsule. Grunting, he heaved the modified Mercury into the sea.

"There goes our oxygen!" Green moaned.

Wastrom reached the constant-tension line and secured the harness under his armpits. Before he could activate the hoist with the pull of his weight, though, O'Brien grabbed on to the nylon rope. Together they started up—but at a painfully slow rate.

The bellowing creature raced forward, but paused to lift the crate of field laboratory equipment and hurl it to the ground. Then he skirted a Gemini capsule containing construction tools and explosive charges and headed once more for the Argo.

O'Brien almost lost his purchase on the line but resecured it by hooking his arm over part of Wastrom's harness.

Abruptly there was a startling explosion next to his ear and the crisp smell of gunpowder drifted in under his hood. Wastrom had

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a revolver in his hand and was aiming down at the lunging giant.

The electronicist fired twice more before he lost his grip on the gun. O'Brien was certain he had scored at least one hit. At any rate, the thing's roaring was now at a frenzied pitch.

But that didn't discourage the creature. He beat his fists against the Procyon stage of the ship until it seemed the hundred and fifty-foot-long configuration was rocking under the impact of the blows.

O'Brien and the electronicist reached the hatch and were pulled in as the boom retracted automatically.

"Good God in Heaven!" Green swore. "This *can't* be happening!"

"What'll we do?" Yardley asked, staring down at the ravaged Alpha Base site. "Blast off?"

"Not with the Spica's fuel still down there." Wastrom knelt and peered below. "It's incredible! Humanoid life on Venus!"

The two giants met amid the devastation and barked at each other until the larger discovered a crate of supplies he had overlooked. Infuriated, he hurled it at the ship, missed, then rubbed his shoulder where a trickle of dark fluid appeared to be erupting from the skin.

Kicking the tractor over on its side, he rejoined his companion and they headed for the forest as thunder boomed accompaniment to their footfalls and rain obscured their withdrawal.

Green eventually recovered his voice. "Let's get *out* of here! The lift can take us all at one time!" He reached frantically for the boom. "Help me, Scott! It's hung up!"

The others only stared at him as a jagged streak of lightning lanced down a quarter of a mile away.

"The lightning arrester!" the Commander explained. "That giant tore it loose! If the Procyon's fuel load takes a bolt, I don't want to be within a mile of the Argo!"

IV

WHEN Zu-Bach finally snored himself awake and rolled over on the shelfbed, K'Tawa swam up out of Meditative Withdrawal.

The Old One rose, uncoiled from Cogitative Posture, ran briefly through the Stretching Exercises and glanced over at his kinsman.

Zu-Bach sat up and massaged his shoulder. "The sting is gone."

K'Tawa quazed the flesh around the wound and learned that the small foreign object had worked itself out. Moreover,

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the pierced skin had almost healed.

Kneeling beside the shelfbed, Zu-Bach directed his horn in a methodical scanning motion back and forth across the mud floor of the hut. Then, "*Here* it is—the stinger."

He rose holding a tiny piece of hard substance between his thumb and forefinger.

K'Tawa shied from the thing. "A hate pellet. Get rid of it."

Zu-Bach went over to the wall, swung the rain shield open and tossed it out.

"Leave it open," the Old One said. "The air is so stale that I wouldn't be surprised if L'Jork could conduct his Ceremony of the Hot Tongues in here without even the help of the Meditators."

The other turned, silhouetted by the weak light coming in through the rain shield opening, and hesitated. K'Tawa could almost guess the question before Zu-Bach asked it. Eagerness was that plain among his features.

"The Presences, the living ones—what are they doing now?"

"I'm not too certain there *are* any living Presences remaining. Soon after you fell asleep there was a tremendous noise. When I quazed in their direction, I encountered a heat and light that were stronger than thousands of Hot Tongues."

"And the Presences?"

"As I said, I'm not at all sure you need concern yourself with them any longer."

"But more will come. We both quazed that much."

K'Tawa drew in a deep, disappointed breath. His lesser kin had not sated himself on the Material. His purpose was still, oh, so singular. It was clear that even now he had no appreciation whatsoever of the Spiritual Values.

"When the time comes," the Old One said heavily, "I'm sure you'll be equal to the situation—and perhaps without my help."

"Oh, you don't think I can quaze the dangers of the lifeless Presences on my own."

"Now, now, boy," K'Tawa chided. "I'm not belittling you. I'm just trying to make you understand that you've been taking up my time during a period when I should be fervently trying to accomplish *Eighth*-Phase Contemplation."

Zu-Bach bristled, with no apparent appreciation at all of the significance of Meditative Ascendancy. "I don't need your help any longer. You think I didn't quaze the danger in the cave by the sea, don't you? Well, I did! And I'm going to do something about *all* the dangers we left behind!"

"Suit yourself, boy." K'Tawa wondered whether he shouldn't

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feel guilty about not discouraging the other. But, on second thought, he had certainly discharged all his responsibilities under the Code of Kinship.

THE hut's main shield swung open and Exemplar L'Jork entered. "I quazed crosspurposes. Is anything wrong?"

"Zu-Bach," the Old One explained, "has still not had enough. He wants to destroy more of the remaining Presences."

"Oh come now, boy," L'Jork scolded. "Materialism has its place. But—"

"K'Tawa will tell you that more Presences are on their way through the Upper Endlessness."

"On their way—from where?"

"I don't know. But when they get here, there will be *more* dangers to cope with. And perhaps more after that. All while you and the others sit around and Meditate!"

He spun on his heel and strode for the main opening.

"Be careful, Zu-Bach," K'Tawa called after him. "Don't underestimate the danger in the cave."

After he had gone, L'Jork asked, "Will he be all right?"

"I think so. The main reason he's going back, as I quaze it, is that he left his spear behind."

"Maybe you *should* go too."

"The Code of Kinship is not without its limitations. Besides, L'Jork, I'm on the threshold of Phase *Eight* Meditation!"

"Phase *Eight*," the Exemplar repeated, visibly impressed. "You don't say!" Then, with unconcealed envy, "Do you suppose you might *actually* glimpse Origin and Meaning in their fullness?"

"Possibly."

"Then you *have* no responsibility under the Code of Kinship. Indeed not. Your first obligation now is Meditation."

On that K'Tawa agreed, and with but few reservations.

"I'll let you alone," L'Jork said respectfully, "so you can get on with your work."

* * *

Deep Cogitative Withdrawal came quickly for K'Tawa this time, as it had on every recent occasion of Meditative Introspection. It was as though he were becoming marvelously efficient in achieving the Ascendant Attitude. Why, it wasn't even necessary for him to engage in the Preliminary Mental Exercise any longer.

Through the fragmented experiences of scores of remote ancestors, he pursued the elusive concept of the Upper Endlessness; searching almost desperately for reference to the Blackness that had already been suggested by the long-gone past.

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This Blackness that shared the Endlessness with the Perpetual Clouds, he wondered—what was its nature? How widespread was it?

Thousands of disembodied memories swam up at him. But they only lapped at the fringe of his curiosity—until—

Once there had been a woman named—"Vir-Ela." She had been young and attractive and—

Intolerant, K'Tawa shunted aside the welter of irrelevant, personal information that would swamp him with trivia if he let it. And he guided his questing concentration down to the very core of the matter.

Once Vir-Ela had looked up into the Blackness of the—"night"? (The latter was a concept he couldn't grasp, but he passed it over in fear that the rest would elude him too.) And in that Blackness were myriads . . . (the word escaped him, but he had at least trapped its meaning) myriads tiny, shimmering motes of light, similar to the Hot Tongues but pinpoint and precise in definition and brilliant, unmoving in their —"celestial"?—positions.

The motes inhabited the Blackness and *it was the Blackness that was Endless, not the Perpetual Clouds!* Actually, he learned in astonishment, the Clouds were neither Endless nor Perpetual. Their existence had been short indeed, as measured against the great time cycles observed by the brilliant, dancing motes. And the full reach of the Clouds was unbelievably insignificant compared with the vast scheme of things beyond them.

INEXORABLY, the word-visions that came from Vir-Ela faded and K'Tawa, bereft, cried out in despair. But the ancestral memory bridge spanning the Vir-Ela generation had only gone a step further, he saw suddenly. It had been drawn to the more remote anchorage by the close bond that had existed between the woman and her mother.

The latter, whose name appeared to have been "Cel-Aroa," had vividly recorded for posterity's sake magnificent, sweeping scenes of Onlyland.

But it *wasn't* Onlyland! For the Old One knew that, compared with the Sorrowing Sea, Onlyland was but a spit of mud and stone. And the land Cel-Aroa had thought about had been vast and almost unbroken, with only small bodies of water here and there.

Now he was getting down to Origins, perhaps. It might even be that he had penetrated so deeply into Phase Eight Ascendancy that he was reaching back to *before* the mysterious Great Debacle!

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The concepts he was receiving were no less than amazing! Cel-Aroa's people had been as great in number as the very land on which they lived was vast in area. And on that Vastland were—what?

He intercepted the concept of huge, shining huts. Only, they weren't huts because they all served inconceivably more complicated functions than the dwelling places to which the people were presently accustomed. And these glittering structures had been piled up beside one another at many locations on Vastland, all reaching for the sky and all full of and surrounded by swarming people.

Oh, but all the people were different then—*so different!* Not a quazehorn among them! ("That came later," the voice of Y-Lem'Ah from the more recent "island" generation seemed to mock.) And there was *something* about their size and their convictions, their manner of life. But what?

Now he had it! Those illustrious ancestors, those incomparable intellects with whom all the Meditators sought to Commune—they, themselves, were not Spiritually Inclined! Not in the least.

Was he to conclude that Ascetic Ascendancy was a way of life that took shape *after* the Great Debacle?

What, he wondered intensely, *was* the Great Debacle?

But no responsive thread of memory arose to satisfy his poignant curiosity.

He had gone *so* far, he realized as he swam exhaustedly up out of Withdrawal. But he had so much *further* to go if he expected to fathom True Origin and Full Meaning.

Nevertheless, K'Tawa found himself yearning for the power and wisdom, the might of those quazehornless ancestors of the remote past, even if all those attributes *were* only Materialistic.

* * *

TWENTY feet back from the cave entrance, Colonel O'Brien tossed restlessly in half sleep. His boot thudded against an oxygen cylinder and instantly he was wide awake.

He sat up groggily, his need for rest after thirty hours' work still not fully satisfied. The dim, everlasting light of Venus' murky sky seeped into the chamber, etching somber shadows on dank walls. In the distance, inside a second entrance to the cave, the Mark IV Collard reactor hummed in wasteful production of electrical energy that would never be used, that was even now discharging itself wantonly to ground.

O'Brien untied the cord that was pinching the respirahood se-

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curely about his neck. Now that he was upright, there would be no danger of the oxygen being displaced by Venus' carbon dioxide. Quietly, so as not to disturb the others, he returned the misplaced O_2 cylinder to the stack from which it had rolled.

"Not many left, are there, Scott?"

He started at the suddenness of Green's whispered voice, further muffled by his respirahood. The Commander came over and knelt by the sparse supply of oxygen containers.

"For the few we do have we can thank Yardley," O'Brien reminded after making certain his transmitter was turned off too. "When that creature got through with Alpha Base, Frank was the one who realized we were wearing the only O_2 we had left. If he hadn't risked his life to toss those cylinders out of the Argo, we wouldn't be around to talk about it now."

As it was, the Colonel added under his breath, the remaining supply of oxygen was no less than fatally inadequate. And Train Beta wasn't due to arrive for another *five* days.

Squatting, Green slapped his knee. "Well, what do we do now—go back over the Recovery Area and see what we can salvage?"

"There won't be *anything* to pick up."

"You think that unicorn thing smashed *all* our other caps?"

"You saw what he had wrapped around his staff. Those Here-I-Am capsule blips didn't just *disappear* from the scope."

Yardley had awakened. He came over and joined them, sitting silently on his haunches and appearing to O'Brien like some prehistoric savage brooding in the dismal confines of his cave.

"Good God!" Green lurched up. "Train Beta—I'd forgotten about them!"

"I hadn't," O'Brien said gloomily.

"What'll we do?" Yardley asked. "There's no way of warning them! That creature smashed both our Del Rouad transmitters!"

"I don't know," the Colonel admitted. "Unless—yes, there *is* a chance of getting through to them—at the last moment."

Yardley stared expectantly at him.

"If they don't hear from us," he went on, "they'll be guarding our field comsystem frequency on the way down."

"We can warn them then!" the nuclear tech exclaimed.

"Yes. But there are two drawbacks. One: It'll be too late to stop their landing—and they won't be able to get off again until after they pick up their Spica fuel capsules."

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"And the other objection?" Green asked.

"You won't like it. I don't. The oxygen we have left will last the four of us only two days. If we're going to get any warning at all off to Train Beta, we'll have to arrange it, somehow, that *one of us* will be around for *five* days."

NOBODY said anything.

O'Brien turned and faced an arm of the sea that ran along the far wall of the cave. "It isn't a decision we have to make immediately."

"When *do* we have to make it?" the Commander wanted to know.

"If four of us use up oxygen for twenty-four hours, there'll still be just about enough left to carry one from that point up to Beta's estimated time of arrival."

Green paced to the subterranean river and back. "I'm glad Wastrom isn't awake to hear this."

"Oh, Wastrom's all right now," Yardley assured. "It took those giants to snap him out of it. But did you see how he reacted? He even attacked one with a rock and wounded it with his gun."

Green and O'Brien exchanged awkward glances and the latter said, "Sorry to disappoint you, Frank. He apparently did come around for a while. But it didn't last long. You'd have seen for yourself if you could have stayed awake a while longer."

"He went to pieces," the Commander verified, "—screaming about violating God's laws and getting the giants as a punishment. Finally whimpered himself to sleep."

Yardley appeared thoroughly disappointed.

"What puzzles me," O'Brien went on, "was his gun—what prompted him to bring it along in the first place, how he hid it."

"I suppose if you were as terrified of space and Venus," Yardley offered, "you might have smuggled a weapon along too, even though you were assured you wouldn't need one."

"Right. But the point is that he didn't appear to be terrified when he sneaked the revolver aboard. He didn't show any neurotic tendencies at all until a week ago."

Green stared at O'Brien. "Where's the gun now?"

"I've got it. You didn't think I was going to give it back."

Yardley tensed. "Listen!"

O'Brien heard it too—a clatter of metal on metal coming from the direction of the demolished Alpha Base. It sounded like someone walking through a field of tin cans.

"Those giants are back!" Yardley shouted.

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"Quiet!" O'Brien cautioned. "They don't know we're in here."

Green crossed fingers on both hands and displayed them high in the air. "Maybe that thing'll go to work on the reserve Spica fuel this time!"

Yardley grinned expectantly. "Colonel, if the Irish have the luck market cornered, you'd better cash in your share right now. Our troubles may be over if that Venutian starts banging those oxygen-difluoride and diobrane containers together!"

"It'll be just like another Argo going up!" Green assured.

"That makes for nice wishing," the Colonel commented. "But I find it more than coincidental that he purposely passed up the Spica fuel first time around—the Gemini with the explosive charges too."

Green protested, "You're not suggesting the thing *knew*—"

FROM the subterranean stream behind them came an abrupt splash.

When O'Brien spun around, Wastrom was standing by the oxygen cylinders, reaching down for another.

"It's coming back!" he shouted. "Can't you hear it out there? It won't let us alone until it's destroyed everything we've got!"

Wastrom faced the stream and lifted the cylinder over his head. But before he could hurl it, Green drove his shoulder into the electronicist's midsection and sent him flailing back.

"We've got to destroy everything!" Wastrom screamed. "We've got to do what it wants!"

"Shut him up!" Yardley urged. "Before he has a dozen giants breathing down our necks!"

Green followed through and smashed a fist into the electronist's face, even as the latter filled his lungs for another outburst.

Then the Commander knelt beside the unconscious Wastrom to make certain his respirahood had not been damaged.

"Back!" Yardley cautioned. "Get back! That thing's right outside!"

O'Brien could hear the giant's labored breathing, like the measured hiss of a safety valve

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on a steam engine. He drew Wastrom's revolver from his pocket.

There was an enraged growl and a great, leering head poked into the cave entrance. But when the shoulders couldn't make it through, the creature drew back and roared. Then a massive arm rammed in and a clawing hand swept back and forth from wall to wall.

The revolver barked three times as O'Brien emptied it at the thing's biceps. One of the slugs grazed flesh.

Bellowing, the giant lunged back. And O'Brien, tracing his retreat by the dwindling sounds of his breathing, went cautiously ahead.

"Careful, Scott!" Green urged.

Hesitating, O'Brien stepped outside and watched the massive creature withdrawing back through the base site. "It's leaving."

"But it'll be back," Yardley guessed. "I'm sure of that."

"It wouldn't if we had a few weapons," Green said.

"Our Venutian *does* seem to hurt and scare easily," the Colonel agreed. "If we could manage to kill one of them, I'll bet the others—if there's a whole settlement of them—would promptly turn tail."

Green ventured farther from the cave. Pensively, he walked a short distance along the beach, then turned toward the base site.

"Ken," O'Brien called after him. "Where are you going?"

The other paused. "There may be just two of those things. Or there may be a whole nest. We've got to know what the odds are. I'm going to find out."

"Ken, come back here!"

It was apparent, however, that he wouldn't be stopped.

O'Brien started to follow.

But Yardley trapped his arm. "Would you really like to kill one of them, Colonel? I think I know how it can be done."

O'BRIEN, staring anxiously after the Commander, was restrained by the realization that the information Green sought *should* be passed on to Train Beta. "How would you do it, Frank?"

"Set a trap." The nuclear technician indicated the heavily insulated cable that snaked across the beach from the Mark IV Collard reactor. "Our tractor's not damaged—just knocked over on its side. I checked it while Green was salvaging those tins of food. We can right the tractor with its own winch, assuming that if the Venutian comes back he'll want to kick it over again. But this time it'll be parked on several insulating layers of plastic tarps. And this high-voltage cable will be bolted to the tractor's frame."

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V

K'TAWA bestirred himself from Meditation, reluctantly yielding his grip on the inherent, sometimes incomprehensible impressions that had been seeping into his conscious. That these impressions were being dredged from the very bottommost depths of genetic recall left no doubt that he was well into Phase Eight Ascendancy.

At the moment, however, he was concerned over Zu-Bach. Even now he could quaze his youthful kin as he left the coastal plain and entered the forest. Zu-Bach, it appeared, was fuming over—something.

The Old One steadied his horn in that direction. Why, it seemed the boy had been stung again by the little Presences, who evidently were still somewhere near the beach!

Then K'Tawa tensed. Not all the living Presences were on the coast. One, he could plainly quaze now, was following furtively behind Zu-Bach, advancing from tree to tree. Only, Zu-Bach's thoughts were so full of rage and vengeful plans that he hadn't noticed the small one at all.

K'Tawa considered going out to meet his kin and making an issue of his utter lack of vigilance. But Zu-Bach would only be resentful of that Exercise of Seniority. Anyway, the Old One saw now, there was no evidence of harmful intent on the part of the trailing Presence. Curiosity, perhaps. And a tinge of bitter frustration. But certainly he harbored no immediate aggressive plans.

Still quazing, K'Tawa watched Zu-Bach lumber up over a hill. After he had started down the other side, the Presence clambered up the elevation and dropped on his chest to peer over the crest. He remained there a long while, staring down into the valley and studying the village. Then he rose and headed back for the coastal plain.

Zu-Bach, meanwhile, had reached the village.

And K'Tawa, delayed his return to Contemplation while he listened to his relative trying to interest several of the Meditators in an account of what had happened to him. But Zu-Bach had forgotten that this was the Feast of Introspection and that the entire period, from sleep to sleep, was set aside for Ascetic Ascendancy.

Thwarted in his quest for attention, Zu-Bach impetuously strode for the nearest hut. He brushed disrespectfully past its Meditating owner and lowered himself onto the shelfbed within.

K'Tawa continued with his own Introspective Quest. And, as a stepping-off point, he concerned

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himself with an unrestrainable flow of questions that phrased themselves spontaneously in his mind:

Why was the Horizontal Edlessness (correction: the curved-back-upon-itself surface) almost all water now, whereas once it had been practically all land?

This concept "night" that he had gotten from Vir-Ela—could he reasonably assume that its corollary was "day"?

And what had the wet-dry, night-day dichotomies to do with the Great Debacle?

Then, from a distant ancestral source, so close to the Great Debacle that it conveyed all the terror and confusion associated with that event, came a momentous suggestion:

There was a *third* dichotomy directly involved in the exclusive interrelationships: "stale-poisonous," as they applied to the air.

Even in his rigid Posture, K'Tawa squirmed in protest. It was an incredible pairing! Dichotomies were made up of opposites. But here was one with parts that were almost compatible. "Pure-poisonous," for instance, would have been logical, as would have "pure-stale." But —"stale-poisonous"?

He turned from the incongruous matter as another link abruptly established itself in the ancestral recall chain. This time he had reached back for a handful of perceptions from one who had called himself "Dis'Pauz." And the memories were all the more welcome because they had obviously been acquired just before the Great Debacle—when knowledge and ability were at a peak.

From that source the Old One received the illuminating impression that the surface-bent-back-upon-itself had once had another name—"The World."

Moreover, The World was *not* alone in the Upper Endlessness. There were other The Worlds—shining deep in the Blackness' vastness!

K'Tawa almost bolted from Withdrawal. *That* explained the origin of the little Presences! They had come from another The World! And the one nearest his ancestors' Vastland enjoyed a day-night dichotomy, just as Vastland itself once had before the Debacle!

Then, as though caught up in a raging vortex of the Sorrowing Sea, the Old One found himself dizzily fighting a relentless, confusing assault of concepts and impressions.

Night-day. Wet-dry. Stale-poisonous. Still another polar pair: Blackness-Light, in its more than ordinary implications. Shimmering motes and The Worlds. Quazehornless ancestors. Vastland—Mainland—Island—Onlyland—

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Night was doubtless the corollary of day, just as wet was so obviously the opposite of dry. And Blackness of Light. But did "little ancestor" have any opposite? Was Blackness synonymous with daylessness. And did—

Then into his foundering Meditation was thrust a quite rational and almost calming recollection bequeathed by Dis' Pauz:

There was the Endless Blackness with its shimmering The Worlds and with its . . . ("lightgivers" was the closest word K'Tawa could find for the concept), which also cast brilliance about them.

And suddenly, deep within the Blackness the Old One saw a huge, white, sparkling cloud—odd-shaped and wispy. And shy, too, for it always hid its long, thin—"tail"?—from the Lightgiver with which it was associated. K'Tawa saw, too, that Dis' Pauz was terrified by the Cloud from the Blackness. And his terror was shared by all the billions of quazehornless people.

Did the Cloud have anything to do, the Old One wondered, with the Great Debacle?

At this point K'Tawa's Meditations, though compelling, were becoming quite burdensome and exhausting. Consequently, he did not know when Contemplation trailed off into sleep.

WHEN he awoke from prolonged Posture, he quazed that Zu-Bach had gone from the other hut. He was in the forest now, returning to the coastal plain. And his scorn and wrath had renewed themselves.

K'Tawa stretched and quazed ahead to the beach. Now that he definitely knew the little Presences were there, he had no difficulty discerning them. They were in the cave, not too far from the Greatest-of-All-Perils. In order to save their stale air, they were resting, having just finished—*having just finished*—

The Old One rose trembling. Just as Zu-Bach had originally feared, they had turned out after all to be Things That Trap! They had just devised a most ingenious snare—not one that would simply take its victim, but one that would *kill instantly!*

And that victim, K'Tawa saw plainly, would be Zu-Bach.

The Old One rushed from his hut, trying to quell his inner anxiety so that the other Meditators wouldn't quaze it and be disturbed. He struck out through the forest.

How malicious were the small Presences! Until now, he had hoped they might not all be as evil as the one had seemed to be. But, whereas before only the one had wanted to kill treacherously, now that one hardly appeared interested in slaying. The other

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three, however, were lustful in their eagerness to take Zu-Bach's life. What a queer reversal of quazable attributes among the Presences!

Pushing as swiftly as he could through the forest, K'Tawa focused his attention on the Trap. Most clever indeed. And it involved a peril that was quite obscure and original—so much so that he felt certain Zu-Bach would never quaze it for himself.

It seemed that the Presences had taken their Thing That Crawls and put it in full sight on the beach near their cave. They had attached to it a hidden something that would leap like the very Lightning itself into Zu-Bach's body.

K'Tawa, his aged lungs burning with unaccustomed exertion, burst out of the forest. Across the coastal plain, his young kin stood uncertainly on the beach, letting the Sorrowing Sea lap at his feet.

Immediately before him was the Trap!

K'Tawa raced across the plain, quazing the four Presences as they watched expectantly from the mouth of their cave. He shouted:

"Zu-Bach! Watch out for the Thing That Traps!"

But the other, hearing, only cast a disdainful look at his senior kinsman and started forward.

Then there was a quazable commotion at the mouth of the cave as one of the living Presences—the one who had first impressed K'Tawa as being wholly evil—came running out and waving his arms.

The Old One had almost reached Zu-Bach. But it was too late. For the latter, lurching forward at the sight of the hated Presence, swung an arm in front of him to push the Trap out of his way.

An odd sort of Lightning played all around his hand where it had come into contact with the thing and he toppled forward.

The excited Presence, terrified now, tried to scurry out of the way. But he failed utterly. Zu-Bach's quite ample chest fell full upon the minor creature.

And K'Tawa, pausing in midstride to ponder his complete failure at saving his kin, quazed that two living beings, Zu-Bach and one of his tormentors, had both achieved instant and final Spiritual Withdrawal.

THE Old One sat on the sand, head lowered and thoughts saddened. For a long while he had proudly committed himself to personal direction of Zu-Bach's Ascendancy. But now his junior kin would taste not even the pleasures of *First*-Phase Contemplation.

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He glanced at the cave. The three remaining Presences had drawn back inside. And the concept of intelligent beings hiding in a cave touched off almost instant Meditation.

All the evidence now being offered by genetic recall pointed to the fact that his ancestors, too, had once lived underground.

But why? Because, came the explanation from a vague source in the far past, if they ventured outside the air would choke them.

The very sky itself, it seemed, had almost—"overnight"?—been filled with suffocating stuff. And there had been other things too—wetness to subdue the dryness, great convulsions of Vastland, total destruction of the day-night dichotomy.

Henceforth, came the unwitting information from his remote forebear, there would be the—Eternal Day.

K'Tawa stirred troublously on the beach. Was that, then, the Great Debacle? Had he had a glimpse of the Awful Disaster?

Despite his fervent search for the answers to those questions, however, his Meditations struck out in their own direction, still drawing from genetic recall:

Quazehornless people in caves. Caves that provided breathable air because their vast underground passages and chambers had been filled with it. Caves that would sustain the handful of people and some of the animals. The air was still fresh there, but would not be for very long—only a few generations. For it was being forced out of the upper openings by water seeping into the lower passages.

Part of the Debacle?

Yes (came confirmation from the impressions of an "Edu'-Aken," who had lived during one of the cave generations), part of the Debacle—an after part.

Was it related to the Vast Cloud that had come from the Outer Blackness?

But nowhere in K'Tawa's genetic recall heritage was there a ready answer to that question.

Then he dragged himself suddenly up out of Withdrawal. He had quazed return of the minor Presences to the mouth of their cave.

Damned little things! But, then again, perhaps he shouldn't be too intolerably disposed toward them. He saw now that their presence had not been all harmful. It had, by association, suggested new channels for his Quest for Origin and Meaning.

They were much like his remote ancestors must have been, he conceded. But, oh, so different! So malevolent! Even now these three in the cave wanted to destroy, trap, kill, possess.

Still confused, the Old One

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headed wearily back toward the village. The others would have to learn Zu-Bach's fate, if they hadn't already quazed it.

* * *

GREEN ventured uncertainly from the cave, stared back over the plain, then returned. "He's gone!"

O'Brien shrugged. "Which leaves us exactly nowhere—unless we managed to buy a little respect for Train Beta when it drops down."

"Poor Wastrom," Yardley said, staring at the fallen giant. "But at least he went out with honor."

"Or," O'Brien added on second thought, "*did* he?"

"What do you mean?"

"Nothing. Just trying to put a few pieces together."

"Well, when it looked like the giant wasn't going to fall for the trap, Wastrom raced out to lure him on."

Green and O'Brien stared at each other.

"Well, didn't he?" Yardley persisted. "Wasn't that what he *said* he was going to do when I tried to stop him?"

"Yes, he did," Commander Green admitted. "But—well, he went out there waving his arms, didn't he?"

"And," O'Brien put in, "I got the impression he was trying to work his way around the tractor, rather than keep the tractor between him and that creature."

"That's what I thought too," Green agreed.

Yardley looked from one to the other. "What do you mean?"

O'Brien frowned. "I'm just wondering: Can you turn a neurosis on and off? Here we had a man obsessed with the fear of death, frightened, whimpering. Can that sort of person go out and destroy himself heroically for a cause?"

"You've got a point," Green observed. "Wastrom could turn it on and off, all right. He wasn't at all neurotic when the Venutians first attacked. He was more rational than any of us."

Again, the Commander and O'Brien traded glances. The latter asked, "You thinking what I'm thinking?"

"Possibly. Let's kick it around a bit. Let's go back to the gun. Why did he conceal it from us—unless he had a good, logical reason for us not to know he had it?"

"Preposterous!" Yardley protested. "Are you suggesting he might have wanted to use it on *us*? If so, why didn't he do it out in space?"

"Because," O'Brien said impulsively, "he didn't *have* it out there! It would have shown up in deviation in our instruments if he had!"

Green snapped his fingers. "That's right!"

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"Then where *did* he get it?" Yardley asked densely.

"It must have been concealed in one of the pieces of equipment we picked up in the Recovery Area."

"But he was never anywhere near any of that equipment Earthside!" Yardley reminded. "It was prepared, assembled and launched hundreds of miles from Canaveral!"

O'Brien nodded. "Which indicates that Wastrom was far from being alone in his enterprise."

Yardley only shook his head incredulously.

"No," Green said. "It wasn't the psych boys who slipped up. It was the security boys."

"His neurosis was all an act then?" the nuclear tech asked.

"A very good one," O'Brien said, impressed. "He knew this operation would be most vulnerable in its earliest stage. Yet, his stake in it was something he had to play by ear. Pretending to be terrified insured tolerance for his 'mistakes.' Until the giants came along, he wasn't at all sure of success, but he was trying."

Green looked up sharply. "The runaway Terrain Walker!"

"There would have been more accidents like that."

"I don't think so. He would have used the gun to simplify matters. But he had probably just gotten it before the oversized Venutians showed up."

"And when that happened, he lost his gun. But in the Venutians he saw his opportunity to let them accomplish his purpose for him—not only against Alpha, but against Beta and Gamma and anything else we would send over."

Yardley straightened. "But he *shot* the first giant!"

"On impulse. He realized later that the last thing he wanted to do was scare them off. That's why he dropped his neurotic act again and turned hero at the end—so he could save the Venutian while pretending to lead him into the trap."

GREEN went and got three fresh oxygen cylinders and passed them around. "Well, we know how this operation stacks up in the Kremlin's book. Think of the effort they took to plant Wastrom."

O'Brien discarded his empty cylinder and snapped the new one around his waist. He stared down at a serpentine length of high-tension cable that stretched across the dank floor. "I think our final reflection on Wastrom can be one of thanks."

"How so?" Green asked.

"He suggested our logical next step. He was probably right in his idea that we might strike fear into the Venutians and dis-

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courage them from attacking Train Beta."

"I don't think the boys in that village will play follow the leader to that rigged tractor—not with one of them bringing the message back."

"No, of course not. So, the thing to do is take the attack to them—before they gang up on us. Frank, that Collard reactor—what's its alternate function?"

Yardley paused. "The plan was that if all the powerplants came through and we needed a nuclear blast for construction purposes, all we'd have to do is goose a Collard up to chain reaction."

"And this one we *will* goose up—after I sling it on the tractor and haul it over to that Venusian village."

Green loosed an exuberant shout. Whooping too, Yardley slapped him on the back.

But then the nuclear technician turned sharply toward O'Brien. "We don't have the radio gear to trigger it off."

"Then it'll have to be done manually."

Yardley was silent a moment. "Right," he said crisply, not broaching the ominous ramifications of the Colonel's statement. "But *I'm* hauling it over. That's in my department."

"No," Green put in determinedly. "*I'm* taking it."

O'Brien hesitated, realizing he would only have a more vigorous argument on his hands if he tried to eliminate them on the basis of their family obligations.

"Nobody's playing hero here," he said. "Things are going to be even tougher for you two. You'll have to decide—and within the next twelve hours—who'll be around when Train Beta arrives."

VI

WHEN K'Tawa reached the village he encountered a scene of agitation such as he had not witnessed before. Exemplar L'Jork and five—he counted them twice—five Meditators were awake and active, despite the fact it was sleeptime. Two of them paced beside the Central Slab while the Exemplar and three others held court, with much gesticulation, in front of the Drying Hut.

Rarely had the Old One seen *that* much disquiet. It was evident they had quazed Zu-Bach's tragic death.

L'Jork hurried over to meet him. "I'm afraid we have concerned ourselves excessively with the Spiritual. We should have listened to the boy, shouldn't we?"

"It was a most regrettable Spiritualization," said the Old One. "Poor Zu-Bach."

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"Could it have been avoided?" asked Lank-Tro.

"I tried. Perhaps the Exemplar is right. Maybe we should have given Zu-Bach a more receptive ear. But, still—"

"Yes?" L'Jork promoted.

"I don't know. I'm a bit confused."

"Well, *we* aren't." L'Jork faced the others. "Rin'Au, arouse the Prephasers."

"What do you intend doing?" the Old One asked.

"We're going to deal with the living Presences. But first we'll have to send for Prephase help from the other villages."

"And," Lank-Tro added, "we'll also be prepared when the other Presences drop down from the Endlessness."

K'Tawa only stared at the ground, somewhat befuddled.

"You don't approve of the plan?" the Exemplar asked.

"I don't know. L'Jork, I'm fully into Phase Eight Meditation now. And I can't be certain the flow of impressions doesn't point to some sort of deep significance."

"Involving the intruding Presences?"

"Perhaps. But then, again, perhaps not. I'd like to Contemplate more—much more."

L'Jork stared critically at him. "K'Tawa, we respect your Eighth-Phase achievements. But sometimes we wonder whether you aren't becoming senile in your Meditations. Do you actually expect us to believe that at the very moment you start discovering Meaning concerning small, quazehornless people of the past—at that very moment and by a great coincidence, quazehornless Presences begin making their appearance here?"

"Oh, no. The coincidence would be too farfetched. But it *could* be the other way around. Maybe the apearance of the Presences merely suggested fruitful channels of Contemplation that hadn't occurred to anyone before."

Rin'Au asked, "What do you advise—about the Presences?"

"I advise nothing. All I'd like to do is Meditate some more."

"You can Meditate all you want," the Exemplar said stiffly. "But I've already decided what has to be done."

K'Tawa quazed that the decision involved precipitous action against the Presences as soon as the Prephasers could be assembled. Nevertheless, he returned to his hut and anxiously distorted his complaining limbs into Cogitative Posture.

Sadly, he realized that all the evidence, fragmentary though it might be, pointed urgently to the Great Debacle as the paramount modifier of Meaning. But for recall after recall, now, he

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had thrust only along the fringe of the Calamity. He had indeed thrown much illumination on his Quest for Significance. But whatever he had recalled had been so confusing that he was unable to wring any comprehension from it.

Perhaps a period of Meditative review was in order. From the reassessment of inherent memories might come understanding, or at least a more Meaningful order.

THERE had been day and night, of that he was certain. Night spawned out of the Endless Blackness. And quazehornless people who were incredibly knowledgeable, who had lived in huge collections of shining structures on Vastland and had known about other The worlds.

And out there in the Upper Endlessness had been a huge, shimmering Cloud, turning back part of the Blackness. Only, it *hadn't* been a Cloud, as he normally entertained the concept. It had been composed of—(he coaxed himself) composed of—

The source from which the answer came was as obscure as the information itself was Meaningless. At any rate, it appeared that the vast, wispy Cloud had been made up of hard-like-stone pieces of water, countless numbers of them. And something else: "solid"—?—poisonous air. No, not quite. But it *had* been hard and, when warmed, it would turn into first choking, then nonchoking air.

K'Tawa paused in Contemplation. Why "choking" then "nonchoking"? How could the air quit being of the one nature and start being of the other? It was beyond comprehension, unless—unless the change had been in the *breather* rather than in the *breathed!*

He tried to pursue the recollection. But, somehow, he sensed he had gone up a blind channel. Then, from a wholly new direction came—*something*. Straining, he forced an element of identity from the impression that was trying to break through.

There had been a—"Fos-Batl"?—who had lived during one of the early cave generations, just after the Great Debacle.

And from that observant individual came fascinating mind-images. Of frightened people massed at the very mouth of a cavern, the gentle flow of fresh air, trapped for generations, passing reassuringly around their bodies. And, in front of them, so close that they could step easily across it, was the line-of-farthest-advance-without-suffocation.

Outside was the poisonous air, it seemed. And inside was the—

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"fresh"?—air. There was much confusion here. And K'Tawa was certain that somewhere along the way Meanings had been swapped. What had once been "stale" or "poisonous" was now "fresh." But he sloughed off the temptation to become involved in semantics. And he sought a closer togetherness with Fos-Batl and the bequeathed memories.

The Old One watched, entranced, as some of the people gathered huge see-through lenthral bags that grew underground. Inflating them, they tied the openings securely about their necks. (The living Presences too, he realized suddenly, used see-through bags of a sort!) This apparently provided portable fresh air and made it possible for the people to stay out of the cave long enough to gather food from the plants for themselves and the animals.

Fos-Batl's contribution to Meaning faded before yet another identity that seemed to tug for K'Tawa's attention. Now he opened his mind to Bel-Uri, of a later cave generation. He noted the young woman's sadness and loneliness as she watched her toddling son play just beyond the line-of-farthest-advance-without-suffocation.

She was heavy-hearted because she knew her progeny was a poisonous air-breather. And he would live on the invisible boundary line only until he had gone through sufficient Physical Ascendancy to strike out on his own. Then he would join the handful of people and animals that had already crossed over.

The point of Meaning here seemed evident: With infinite mercy, Providence had gradually given the people the ability to breathe the new kind of air that the Cloud from the Blackness had brought. Just as, later, that same Providence had provided quazehorns.

He tried to penetrate even deeper into the mainstream of ancestral memory. But the impressions came too rapidly to be orderly, and they were too vague for useful comprehension.

"K'Tawa, wake up and quaze toward the coastal plain!"

The Old One reluctantly returned from Withdrawal and opened his eyes to see L'Jork standing anxiously above him.

The Exemplar pointed. "Quaze out that way, quickly!"

And K'Tawa took in the approach of the living Presence on the Thing That Crawled. Too, he sensed the Awful Danger the little one was bringing.

* * *

STEERING the tractor through a field of strewn boulders, Colonel O'Brien finally left the coastal plain and headed into the forest. Suspended on

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the crane ahead of him, the Mark IV Collard reactor, damped into silence, swung ponderously with the lurching motions of the vehicle.

"All right, Scott—I can't see you any longer," came Commander Green's voice over the comsystem. "You're on your own."

"Straight into the woods?"

"As straight as you can go. Soon you'll see a small stream—"

"Crossing it now."

"And then, on the other side, a lot of short, thin trees with leaves that look like black cobwebs."

"Roger. I'm in them." O'Brien used a dripping hand to wipe an accumulation of raindrops off his respirahood. "There's a channel through them that looks pretty well trampled."

"That's it. Just follow it on. And, Scott—keep in touch."

"Right."

The tractor's right tread dropped into a depression and the Collard reactor jerked over in that direction, coming down hard on its suspension cable. O'Brien couldn't understand why the line hadn't snapped. He decreased speed markedly.

He glanced up at the black, rolling sky and watched several bolts crash down into the forest. But soon the torrential rain was obscuring even the lightning.

That, however, was to his advantage, he assured himself. In an Earthside environment, this sort of operation would be carried out under the cover of blackest night. But with Venus' eternal day, the next best thing was a severe rainstorm to add to the murkiness. That the chance of taking a bolt broadside had also increased was, of course, an added complication.

"Frank?" he called.

"Yes?" Yardley's answer was instant.

"You sure you've got this thing rigged up right? It's our only shot. I wouldn't want to blow it."

"She'll go," the nuclear tech promised. "All you have to do is touch the free wire to the negative pole of your battery. Everything else'll take care of itself."

O'Brien squinted through the rain, checking the twin leads that rose along the suspension cable, curved in and out of the boom's bracework and dangled down beside the seat. One lead was already grounded on the steering column. The other, well wrapped in makeshift insulation, lay beside the open battery box, anchored there with a piece of plastic cord.

AGAIN his hood had become almost opaque from perspiration within and the pelting rain without. He removed it and

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pulled out his shirt tail. While he gave the hood a thorough wiping, he breathed slowly at first, then gaspingly. Venus' air went in and out without any difficulty. But the "trace" of oxygen was too pitifully inadequate for starved capillaries.

Swiping the tepid rain from his face, he lowered the hood once more. He imagined he was a bit more comfortable—but only immeasurably so, what with carbonated water and sweat pasting his clothes against his body.

"Getting anywhere, Scott?" Green asked.

"I've left the saplings—if that's what they were—behind now. Going into some pretty stout timber."

"Just push on straight ahead."

"Which way *is* straight ahead?"

"You should see a swamp off to your right."

"Roger."

"Beyond that and a bit off to the left there should be a hill."

O'Brien peered past the swinging Collard reactor. "I can just make it out. The rain's letting up. A hill with no trees on top?"

"That's it. From the crest you'll see the village."

"Good enough."

The Colonel took his attention momentarily off the swinging powerplant and glanced up at the trees—crazy, grotesque things that reared somberly into the Venusian twilight for perhaps fifty feet or so, then broke out into a ridiculous pattern of twisted branches and impossible foliage.

Only vegetation like *that*, he reflected, could be expected to exist on this kind of a world. It was undoubtedly efficient in separating what little oxygen there was from the Venusian atmosphere. But when it got through taking care of its biochemical needs, there was none left to discharge into the air.

Suddenly Yardley was back on the comsystem. "Scott, I can't let you go through with this—not when there's a way out!"

O'Brien sighed. "I was hoping you wouldn't discover the way out for at least another fifteen or twenty minutes."

"You *know?*"

"Yes, I thought of it. But getting this job done is more important. If we're talking about the same solution, you'll know it was a matter of 'either-or'."

"Yes, I see that now," Yardley acknowledged listlessly. "And I suppose you're right. Getting rid of that nest of Venutians as quickly as possible *is* more important."

Commander Green's puzzled voice erupted. "How's about letting *me* in on this"?

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"Well, we could have blocked off a small section of the cave," O'Brien explained. "With all the juice this Collard puts out, it wouldn't have been too hard to set up some sort of electrolytic process. It probably wouldn't have given off *a lot* of oxygen—but maybe enough to keep us going."

"Sounds great! We could hibernate here until just before Train Beta's ETA, *then* rig up the attack deal you've got going now." But exuberance faded from the Commander's voice as he spoke.

"Yes?" O'Brien encouraged.

"Oh, I see. That would give the Venutians four days to figure out some way of smoking us into the open. And then we might not have a shot at their nest before Beta arrives."

THE Colonel crested the hill and pulled the tractor to a halt. Ahead, the forest thinned out on the downslope. And perhaps half a mile off was the village—a disarray of huge, clumsy huts of no apparent standard shape or formal design.

Then he tensed. Four huge Venutians, all carrying stone-tipped spears, were lumbering up the hill. A fifth, lean and slower in his stride, followed. O'Brien recognized him as the one who had twice been to the Alpha Base site.

He started the tractor forward at full speed. "This is it," he said calmly into his throat microphone. "There's a counter-attack shaping up below. But I'm going to try and crash through to their nest."

"What if you get hemmed in before you reach the village?" Yardley asked.

"I'll let it blow right here. We'll get at least five of them. And the blast should have *some* effect on the village."

He skirted around a tree, half skidded into a ravine and lumbered out again, then broke into an open stretch.

The four giants had mounted a violent charge. But the fifth was acting as oddly as he had after the death of his companion on the beach. He had seated himself, crossed his arms and legs and bowed his head until touching the ground.

O'Brien unsheathed the negative lead to the Collard reactor and held it in readiness above the battery box.

But while he had taken his eyes off the Venutians, he hadn't noticed that the branch of a scrub tree had gotten caught in the crane's suspension cable.

The tractor's forward momentum had bent the bough like a bow by the time he saw what had happened. Desperately, he tried to brake his speed. But it was too late.

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The branch slipped free and lashed back, catching him full in the chest and catapulting him from the seat.

Stunned, he struggled up and staggered after the vehicle. But he hesitated, —realizing that many things were horribly wrong.

The tractor, trailing the negative lead that was to have set off the Collard's chain reaction, was going too fast for him to overtake it.

Furiously, the giants were bearing down on him.

And his lungs were convulsing from lack of oxygen.

As he slumped, suffocating, to the ground, he saw the reason for the latter complication.

His respirahood—oxygen cylinder and all—had been hurled into the tree and was caught on a branch twenty feet over his head.

VII

COMMANDER Green paced the beach near the cave while Yardley sat staring at the forest.

"It's no use," the latter said dejectedly. "It's been over three hours. He would have set it off by now."

"What do you suppose happened?"

"With him out of radio contact, we can only assume the worst."

Green leaned against a boulder and glanced down at the gauge on his oyxgen cylinder. It showed only a couple of hours' supply left. He wondered if the nuclear technician, too, was aware that their cut-off point was only two hours away. At that time, there would be fresh oxygen—but only for the one who would hang on to warn Train Beta.

Nervously, Yardley scooped up a handful of wet sand, tossed it into the air, caught it and hurled it seaward. Then he disappeared into the cave.

Green stared at the entrance, shifting his gaze alternately to the forest. He knelt on the beach. With a stiff finger, he inscribed in large letters on the moist sand:

"I won't be back. Carry on. Tell Beta hello for me."

Purposely, he snapped off his personal transceiver so he wouldn't have to put up with any argument. Then he struck off inland.

* * *

EXEMPLAR L'Jork and Meditators Rin-Au and Lank-Tro sat around staring uncertainly at one another in the overcrowded confines of K'Tawa's hut. Occasionally they cast impatient glances at the Old One, who was

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coiled up in Cogitative Posture against the wall—motionless, unbreathing, deep in Withdrawal.

"I must admit," Lank-Tro complained, "that I don't know what's going on."

"K'Tawa's Meditating," the Exemplar said evenly.

"Yes, I know. But why did he want us all in here with him? And why was he so explicit in his insistence that we *not* Meditate?"

"Because he wanted us to stay awake."

"But if we were Withdrawn, it wouldn't be so stuffy in here."

"He tried to explain, but I didn't understand. He was in such a hurry to return to Contemplation."

Rin'Au betrayed his own confusion. "What's he Meditating on?"

"Ultimate Meaning, I believe he said."

Rin'Au glanced unappreciatively around him. "I don't like it—catering to the whim of an old one. I—"

Lank-Tro sat up sharply and aimed his horn in the direction of the hut's south wall.

"I quaze it too," L'Jork spoke out, "—another little Presence making his way through the forest."

"I don't quaze any danger."

"No, but he must be attended to nevertheless."

"I'll get some of the Prephasers to take care of him in the same manner K'Tawa took care of the other intruder."

The Exemplar went out of the hut and returned—all in the space of but a short while.

"Can we be sure there is no longer any danger from the Thing That Crawls?" Rin'Au asked after L'Jork had again seated himself.

"Absolutely. K'Tawa personally gave it a good quazing. Then he did what had to be done to deprive it of its hazardous potential. Anyway, he had it removed from the immediate area."

Silence claimed the hut as the three Meditators quazed clearly that the bold living Presence who had been advancing on the village was properly taken care of by the Prephasers.

There was much shrill shouting for a while, of course. But what could the little one do against the grip of hands that were so huge, relative to his own?

Later, when the see-through covering was snatched from his head, there was such a commotion that the Meditators were led to declare they had never quazed such fright.

THEN K'Tawa stirred and all eyes turned expectantly on him. He disengaged himself

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from cogitative Posture and took his time going through the Prescribed Exercises.

Finally J'Jork could wait no longer. "Was your Contemplative Quest as successful as you thought it would be?"

"Even more so." The Old One's eyes were full of wonder and respect, as though they had beheld nothing less than Total Revelation. "Did you dispatch the Prephasers?"

"They are on their way and should be nearing the cave by now."

Lank-Tro added, "But only one of the Presences is still there. The other—"

"Yes, I quazed what happened."

"Your Meditations, K'Tawa," the Exemplar begged, "—*what* did you learn?"

"I might not have learned anything if the direct sight of the little Presence gasping for stale air out there on the hillside hadn't suggested the final direction of Meditation."

"But what *did* you learn?"

"The Meanings of a vast Cloud in the Blackness, of another The World, of air that suffocates, of the Great Debacle, of a distant quazehornless one—not an ancestor, because he established a divergent, independent lineage—one who built a huge ship, of—"

"Get to the point, Old One." L'Jork urged. "If you *have* achieved full Eighth-Phase Ascendancy, I should imagine that Origin and Meaning would come through much more coherently."

"The incoherence is in the relating, not in the understanding."

"Who was this quazehornless ship builder?" Rin'Au asked.

But the Old One had decided upon his approach. "Imagine a great Cloud coming out of the Darkness far from Onlyland—rather, Vastland. The Cloud is shaped like a spearhead. The people *see* it and are afraid, for there are no Perpetual Clouds in the way.

"This thing from the Outer Blackness passes close to The World. It leaves part of itself to settle down into the air. It dumps much water into and through the air—enough to coyer practically everything except what we now know as Onlyland. The influence of the Cloud itself, followed by the almost instant grip of water on land, makes the Day Eternal."

K'Tawa pinched the bridge of his nose, as though to coax out more of the things he had recalled.

"Even before the vast Cloud arrives, though," he went on thoughtfully, "the builder of the ship—I have yet to remember his name—gathers about him a

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handful of frightened people and loads them aboard his great vessel,"

"Where did they go?" L'Jork asked, interested.

"To another The World—the one that was, rather *is* closest to what our ancestors called their The World. In that way, the builder established his independent lineage."

"And *our own* lineage?"

"It derives from the remnants of those who stayed behind—stayed behind and acquired quazehorns and grew in size and learned to avail themselves of ancestral impressions and—oh, yes, I almost forgot: You see, this vast Cloud from the Outer Blackness also brought with it practically all the air that exists today. But it was air that our ancestors couldn't breathe."

Link-Tro frowned dubiously. "If *they* couldn't breathe it, how is it that *we* can?"

"Somewhere along the way we *learned* to breathe it. Rather, we underwent changes that *enabled* us to breathe it."

L'JORK stared across the hut. "But you said all this had something to do with the little intruding Presences."

"It does. Those Presences descended from the ship builder."

"You mean they are covered by the Code of Kinship?"

K'Tawa nodded soberly.

"I won't believe that, although I know you couldn't consciously falsify. If they are Kin, then why did they kill Zu-Bach?"

"We overlook one thing. Zu-Bach tried to kill them first. Anyway, they must have lost their knowledge of Origin and Meaning, just as we did—although they seem to have climbed back closer to the level of our common ancestors than we have."

K'Tawa bowed his head, only now beginning to appreciate the significance and impact of the Revelations. Kinship had, in a manner of speaking, been actively re-established. And, even from the constricted vantage of the present, the Old One could quaze that life would soon be unrecognizably different for the Onlylanders.

There would perhaps be not as much stress on the Spiritual, much more on the Material. And there would come the time when the Onlylanders, too, would use the great, shining instruments of the intruders and themselves wander into the Outer Blackness.

L'Jork broke the silence. "What about the stale-fresh air?"

"That was the most difficult of all to comprehend. And, when it finally came as I Meditated

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briefly on the hillside, it didn't all come from ancestral impressions. Part of it I quazed from the sight of the little Presence gasping for breath beneath the tree."

"What *about* the stale-fresh air?" the Exemplar prodded, trying to guide him more directly to the point.

"It's simple now. We learned to breathe the new air that the vast Cloud from the Upper Blackness brought. When we did, we also started breathing *out* the kind of air that the little Presences must breathe *in*."

K'Tawa glanced sympathetically, almost affectionately at the small Presence who still slept on the floor of the hut. He hadn't moved since he had been placed there.

The Old One quazed L'Jork and the two other Meditators. Now they understood. And they didn't mind that they had to sit around in a stuffy hut so that the little one might not suffocate.

* * *

WITH the distant booming of thunder still fresh in his ears, awareness gradually returned to Colonel O'Brien. Sensing an underlying inconsistency, he lay there without moving.

Then he tensed with the suspicion that it might not have been thunder at all. It had been too regular, modulated by a cadence that was all too suggestive of—

Abruptly his mind was aswirl with vivid, harrowing recollections of gigantic Venutians bearing down on him, of his respiragear caught irretrievably in the tree, of himself suffocating in the Venusian sea of carbon dioxide and nitrogen.

Confounded, he lay still and cautiously flicked an eyelid open.

Right there in his immediate field of vision was a naked foot fully the length of his arm!

With the motion of but a single eye, he traced the ankle to the massive calf and followed the limb on up to its ponderous kneecap.

The leg moved slightly and, instantly, O'Brien snapped his eyelid shut. Thank God, he reflected, that he had had the presence of mind to remain absolutely motionless! At least, he might hope for the advantage of surprise.

Something that felt like a log came out and prodded his shoulder—but not roughly. The giant *knew* he was awake! Nevertheless, he stayed rigid—until—

He lurched into a sitting position and his hands shot up to explore his face.

No hood! Here—in this Venusian hut, apparently—he was breathing normally, comfortably without *respiragear!*

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His astonishment retreated before burgeoning fear as the nearest Venutian—there were four of them, he saw now—dropped anxiously to his hands and knees and advanced.

The creature was the one who had been on the beach. And he was smiling. But O'Brien couldn't tell whether it was an expression of malicious anticipation or amusement or something else entirely.

He cowered against the wall and dodged the great, sharp horn when he found it poised above him. Then the huge head came within inches of his own, pulled in a mighty lungful of air and—*blew it out gently into his face!*

It was pure, fresh—like the exhilarating afterbreath of an Earthside thunderstorm!

The other Venutians watched as the first repeated the action, then went back to join them.

O'BRIEN only sat there paralyzed with astonishment. But perhaps it *wasn't* so incredible after all. In a metabolism based on the formation of carbon-nitrogen bonds, the carbon dioxide would have to be reduced—in a process analogous to photosynthesis, perhaps—so that carbon would be available for molecular combination. As a result, the left-over oxygen might be discharged from the system!

He was suddenly aware of the pressure of the microphone against his throat when he heard the earphone's diaphragm vibrating tinnily in the silence. Retrieving the latter instrument as it dangled from his waistband, he positioned it in place.

Yardley was shouting, "Green, where are you? Come back! Something's happened!"

O'Brien answered, "Yardley, what is it? Where are you?"

"Scott! Good God, but you *can't* be alive!"

"I'm here in the village—with the Venutians."

"What?" There was utter disbelief in the nuclear tech's response. "But your oxygen gave out hours ago!"

"Apparently I don't need any—not here, at least. What—"

A third voice broke in on the comsystem. "Scott! Is that you—*here in the village?"* Green demanded.

"Yes, you see, I—what do you mean—*here* in the village?"

"That's where I am. I got jumped in the forest and they took me into one of their huts and relieved me of my hood and—"

"And you aren't having any trouble breathing."

"No, of course not. You aren't either. Why?"

"There're a few Venutians in there with you?"

"Three."

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"As I thought," O'Brien disclosed.

"You *know* what's going on?"

"I think so. I'll explain later."

One of the Venutians, the same one, had come forward again—but still not threateningly. He looked up occasionally and smiled as he traced designs on the hut's soft-mud floor.

Yardley finally broke in. "Well I wish somebody would explain it to *me*. About half an hour ago three Venutians showed up on the beach. One was dragging the tractor-crane and the Mark IV reactor. Another had our standby Del Rouad transceiver capsule. The third brought the backup cap with all the reserve O_2 cylinders. I don't know where they got them, but the stuff is all in front of the cave now."

"In which case," O'Brien said smugly, "you might mount the tractor, drop the Collard powerplant and come pick us up. And, oh yes, you'll find some spare respirahoods packed in with the O_2 cylinders. Bring a couple along."

The now obviously friendly Venutian had finished his sketch. He stepped back and proudly gestured toward it.

He had thumbed a large depression in the floor and drawn three concentric circles around it. In each circle he had thumbed another indentation. He touched the second largest circle and spread his arm all-inclusively around him. Then he touched the largest and pointed to O'Brien.

It was evident that these Venutians, their gaze forever obscured by an eternally unbroken cloud cover, somehow had access to knowledge beyond their apparent reach. "How," O'Brien decided, would have to be explained later—as would their humanoid forms and their sudden reversal in temperament.

"Scott," Green said, "there's a lot we have to learn about these natives."

"An awful lot. And I think we're going to run into a few surprises along the way."

"What about Train Beta?" Yardley wanted to know.

"Come pick us up and we'll set up the Del Rouad so we can contact them. We ought to let them know that everything's positive in the Recovery Area."

THE END

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ARTHUR C. CLARKE

By SAM MOSKOWITZ

AMONG science fiction writers who have gained their eminence since 1940, Ray Bradbury is possibly the only one as familiar to the general public as Arthur C. Clarke. This is a popularity that has been rewarded in terms of economics as well as prestige. Clarke's 1961 novel, *A Fall of Moondust*, achieved the unprecedented distinction of being the first interplanetary story ever used in READER'S DIGEST CONDENSED BOOK LIBRARY. Yet it is doubtful if it would ever have been considered were it not for the fact that Clarke had nine years previously enjoyed a BOOK-OF-THE-MONTH-CLUB choice (July, 1952) for an exposition of popular science titled *The Exploration of Space*.

This gave Clarke literary status. Book publishers who had previously ignored his fiction were now delighted to feature it on their lists. Not only did Clarke's science fiction receive *lead* reviews, but they were evaluated as *serious* efforts. *A Fall of Moondust* was possibly the most profitable of all Clarke's works of fiction, but his standing as an important writer was established when THE NEW YORK TIMES and other highly regarded sources of literary criticism gave lead and praise-saturated reviews to the Stapledonian concepts in his *Childhood's End* published by Ballantine Books in 1953.

IT is relatively common for a leading fiction writer to shift into non-fiction and be received with enthusiasm. It is far less common for even a top figure in non-fiction to move on to wider recognition in the realm of romantic make-believe.

This is the background of Clarke's achievement.

Almost as far back as the family tree could be traced, all of the Clarke family had been farmers. When Arthur was born on Dec. 16, 1917, on a farm in Minehead, Somerset, England, it was reasonable to suppose he would follow in the tradition of his ancestors. But when he was 10 his father gave him a series of cigarette cards of prehistoric

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animals. Young Arthur went quietly mad on the subject of paleontology, collecting fossils at a furious rate. Before Arthur was 12 his father had died and his mother had to struggle to keep the farm going and her son in school. She received small help from the boy, whose interest shifted from paleontology to astronomy. To implement this switch he constructed his own telescopes out of old Meccano parts. Alexander Graham Bell, inventor of the telephone, had also patented the photophone, a device by which sound waves vibrated a beam of reflected sunlight and the receiver changed the varying light intensity back into sound. Clarke built his own photophone transmitter from a bicycle beam, and also played with audio modulation of sunlight by mechanical means. And in 1927 Clarke discovered AMAZING STORIES.

He must have seemed a strange teenager to fellow students of Huish's Grammar School in Taunton. By his 15th birthday he was writing fantasies for the school paper and making his mark as an assistant editor. As early as that it was obvious that all his life he would be torn betweeen the fascinating realities of science and the siren's call of imaginative day dreams.

Today, with both the American Rocket Society and The British Interplanetary Society respected scientific institutions, and recognized factors in the advancement of research through their handsome journals, it has been forgotten they were *both* launched by science fiction editors, writers and readers. The former was pioneered by David Lasser, editor of WONDER STORIES, in New York on March 21, 1930. The British Interplanetary Society was founded by P. E. Cleater, a science fiction enthusiast, in October, 1933 in Liverpool, England. Clarke discovered the existence of the English organization through science fiction correspondents and joined it during the Summer of 1934 as an associate member. This seemingly simple act was to develop into the most profound and far-reaching decision of his life!

WITHOUT the money for higher education, Clarke took a civil service examination for a position as auditor in His Majesty's Exchequer and Audit Department. It was the depression; openings were scarce. Over 1500 people competed for the positions available, and Clarke, who came out 26th in ratings, managed to secure a post in London. He moved to that city in 1936 and rented a room in a house at Norfolk 2, so

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tiny that it became the standing joke of his acquaintances. When he entertained a visitor, he had to open the window and sit partly outside the room; otherwise there wasn't any space for the two of them and the bed. The alternative was to leave the door open and have one party sit in the hall.

A London Branch of the British Interplanetary Society was formed Oct. 27, 1936, at the offices of Prof. A. M. Low, 8 Waterloo Place, Piccadilly. Low was a respected inventor and the editor of ARMCHAIR SCIENCE as well as the author of a number of books of popular science and juvenile fantasies. Behind this move was a desire to shift BIS headquarters to London. Arthur Clarke was made treasurer of the Society and began actively to work for the group.

Earlier, he had begun writing for the British science fiction fan magazine NOVAE TERRAE, a mimeographed, quarto-sized publication which was the official organ of The Science Fiction Organization. In his article *Science Fiction—Past, Present and Future* (June, 1937) he stressed the importance of accurate science about rocketry in science fiction magazines, since most of the BIS membership was recruited from the ranks of their readers. In the same magazine he championed for excellent science *with* good writing in a literary debate on the essentials of science fiction with C. S. Youd, who was to become renowned as John Christopher, author of *No Blade of Grass*.

Clarke joined forces with Maurice K. Janson, editor of NOVAE TERRAE and William F. Temple (eventually to become a prominent science fiction author) and rented an apartment at 88 Gray's Inn Road, W.C. 1. The magazine was mimeographed there and the science fiction club used the apartment as a weekly informal meeting place. Club activities both in rocketry and science fiction helped Clarke come in contact with people who could help him in a writing career.

The first money he received from writing was from Eric Frank Russell, then a 32-year-old commercial traveler, residing in Liverpool, who had recently sold a number of stories to ASTOUNDING STORIES. Russell, a fellow member of the British Interplanetary Society, utilized some ideas supplied him by Clarke in a science fiction story he sold and turned part of the proceeds of the sale over to the young aspirant. Even more important was Clarke's association with Walter Gillings, the leading science fiction fan in Britain during the '30's and publisher of a fan magazine titled SCIENTIFICTION. Gillings had been driving

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hard to convince British publishers to issue a science fiction periodical and after many failures had convinced Worlds Work (1913) Ltd. that they should try a one-shot, TALES OF WONDER, with Gillings as editor.

Gillings purchased from Arthur C. Clarke two articles. The first, *Man's Empire of Tomorrow* (Winter, 1938) was a smoothly written astronomical rehash of what was known about the planets of the solar system. The second, *We Can Rocket to the Moon—Now!* (Summer, 1939) championed the practicality of space flight. Clarke was now a professional writer.

CLARKE was secretly working on a novel which would eventually solidify in 1946 as *Against the Fall of Night*, but during this period his only other ventures into fiction were two trivial efforts, *How We Went to Mars* and *Retreat From Earth*, both appearing in the March, 1938 issue of AMATEUR SCIENCE STORIES, a legal-sized mimeographed fan magazine edited by Douglas W. F. Mayer and published under the auspices of The Science Fiction Association to encourage budding British writers. Important to the direction of his future was the appearance of his first technical article in THE JOURNAL OF THE BRITISH INTERPLANETARY SOCIETY for Jan., 1939, titled *An Elementary Mathematical Approach to Astronautics*. It dealt with the problems of determining ratios of combustion of fuel to mass of the rocket as related to velocity.

C. S. Yould's (John Christopher's) publication THE FANTAST, in its inaugural issue (April, 1939), featured a long poem by Clarke, *The Twilight of the Sun*, which ended with the lines:

"The Intellect, pure, unalloyed, on courage
eternally buoyed,
Will span the vast gulfs of the void and win
a new planet's fair face.
For one day our vessels will ply to the uttermost
depths of the sky,
And in them at last we shall fly, ere the darkness
sweeps over our race."

Modesty was not one of Clarke's youthful virtues and his nickname everywhere in the amateur publications was "Ego". After a while it became so much a part of him that he began to byline his articles Arthur Ego Clarke instead of Arthur C. Clarke.

Clarke entered the Royal Air Force in 1941 and remained until 1946. He started as a radio technician and rose to flight lieutenant. His scientific interests and aptitudes now stood him in good stead, since he was involved as a technical officer on

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the first experimental trials of Ground Controlled Approach Radar. While in the RAF he began writing again. A technical paper on time-base circuits appeared in WIRELESS ENGINEER. But more important was *Extra-Terrestrial Relays* in WIRELESS WORLD for Oct., 1945, in which he proposed three earth satellites in orbit for global television. This may have been the first serious prediction of the concept and Clarke later (Rogue, Nov., 1962) indulged in self-recriminations for not attempting to patent the idea. At the end of the war he won first prize in RAF QUARTERLY for his essay *The Rocket and the Future of Warfare,* involving the wedding of atomic warheads and rockets.

MAJOR credit for reviving The British Interplanetary Society after World War II belongs to Clarke. He strenuously set about drawing other rocket societies under the aegis of the BIS. Early in 1946 the BIS resumed operations and the same year Clarke was elected Chairman of the Society in recognition of his services. These services transcened the mere organizational, for he enrolled George Bernard Shaw as an enthusiastic member. Shaw had voluntarily joined when he was sent (and read) Clarke's *The Challenge of the Spaceship* published in the Dec., 1946 issue of THE JOURNAL OF THE BRITISH INTERPLANETARY SOCIETY. The article delineated the scientific and philosophical reasons for space travel. It was collected as the title essay of a book of related articles published by Ballantine in 1961.

With the end of the war, the British publishing industry struggled to return to normal. Edward John Carnell, a leading scientifictionist who had once guest-edited the Dec., 1937 issue of THE JOURNAL OF THE BRITISH INTERPLANETARY SOCIETY, talked Pendulum Publications into issuing NEW WORLDS. At the same time, Walter Gillings convinced The Temple Bar Publishing Co., London, to try a similar venture titled FANTASY. Clarke found his old friend E. J. Carnell receptive to the use of *Inheritance* for the third issue of NEW WORLDS, published undated as Number 3 in 1946. Dealing with precognition and a son destined to fulfill his father's vision, the story did not merit publication, yet Clarke managed to sell it again to ASTOUNDING SCIENCE FICTION where it appeared in the September, 1948, issue.

Clarke began submitting to ASTOUNDING SCIENCE-FICTION, clicking with John W. Campbell with a short story titled *Loophole,* which appeared in the April, 1946 issue. This proved a

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weak effort involving Martians who forcibly quarantine earth by forbidding use of space ships, and then are beaten when interplanetary matter transmitters are devised and their wards turn up in their own back yard.

By contrast, *Rescue Party*, published in the following May, 1946, number provided taut, fascinating suspense as an alien space ship attempts to explore earth's vacated cities in just seven hours before the sun will explode into a nova. In this short story, two major influences on Clarke are instantly apparent: John W. Campbell, in the Don A. Stuart vein creating a mood of sympathy and admiration for the creations of man and the faithful machines that have served him; and Olaf Stapledon, whose intellectual grandeur sent the imagination racing to the limits of time and space. Suspense in *Rescue Party* is created by the intellectual presentation of the problems and *not* by stylistic rendition. In method, Clarke acted in this story and most of his future stories as the observer or historian and never as the participant. The reward for reading concentration is a surprise ending. *Rescue Party* proved a matter of chagrin to Clarke because its popularity and frequent reprintings implied that he had improved little over the years.

Gillings finally cleared postwar paper shortage hurdles and got the first issue of FANTASY out with the date line Dec., 1946, carrying Clarke's story *Technical Error*. The plot concerned a power house accident in which a technician's body is reversed like a mirror image and as a result he is unable to absorb nutrition from his food. In an attempt to restore him by repeating the accident, the entire installation is destroyed. The story required reader concentration, but it won first place in reader approval in the issue and four years later was reprinted in the U.S. by THRILLING WONDER STORIES (June, 1950) as *The Reversed Man.*

FANTASY only ran two more issues and Clarke had a story in each under a pen name, because he considered the efforts too inferior to dignify with his own by-line. He used Charles Willis for *Castaway* in the April, 1947, issue, a mood piece where navigators on an airliner obtain a glimpse of a strange and awesome life form that has been blasted free of the sun and is dying in the "frigid" clutch of the earth. Nothing else happens but Clarke successfully conveys the wonder and the tragedy of that brief encounter. *The Fires Within,* published under the name of E. G. O'Brien in the August, 1947 and final issue of

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FANTASY (printed in the U.S. in the September, 1949 STARTLING STORIES) was one of Clarke's most successful shorts. The discovery and emergence of a high-density race of creatures underground inadvertently destroys all surface life, leaving the subterranean race conscience-stricken.

THROUGH the auspices of a member of Parliament, Clarke as a war veteran was subsidized by the government at Kings College, London. In two years he obtained a First Class Honors B.S. in physics as well as pure and applied mathematics. He entered school in October, 1946, and graduated in 1948. Little appeared by him during these two years but he finally saw published *Against the Fall of Night* in the Nov., 1948 STARTLING STORIES, a novel regarded as one of his key works. It was begun in 1937 and, after five revisions, completed in 1946. It had been turned down by Campbell, who probably was instantly aware that this novel had been intended as a prelude to his own stories *Twilight* and *Night*, published in 1934 and 1935.

What Clarke has done in this novel of a determined boy who frees a moribund civilization of its ennui and gives it back the stars, is to explore in additional detail the intriguing implications of Campbell's *Twilight*, to create a mood in the fashion of Clark Ashton Smith and to zero in to a climax on the ideas of Olaf Stapledon. Clarke essentially changed nothing when he expanded the novel to *The City and the Stars* in 1956.

In looking at the genesis of his particular story, it becomes obvious that Clarke is one and apart from today's body of science fiction. It is as if Robert Heinlein, A. E. van Vogt, Theodore Sturgeon, Isaac Asimov, Ray Bradbury, and the entire crew of "moderns" had never existed. He owes nothing to them and has derived nothing from them. His roots go back before 1938; his method has evolved from that older body of science fiction.

AFTER college Clarke got a job, in 1949, on the staff of the Institution of Electrical Engineers as assitant editor of SCIENCE ABSTRACTS. This kept him abreast of the latest developments in science and gave him time to step up his writing schedule. *History Lesson*, published in the May, 1949 STARTLING STORIES evolved from the same basic idea as *Rescue Party*, but took a different direction. Here, Venusians land on earth after human life has been destroyed by a new ice age and

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they judge the life and inhabitants of the planet solely by an old Donald Duck cartoon they find.

The Wall of Darkness, which appeared in the July, 1949, SUPER SCIENCE STORIES is beyond doubt one of Clarke's finest short stories. Related in the manner of Lord Dunsany, it tells of a far-off world at the edge of the universe, completely split by a gigantic wall, a wall with only *one* side like a Mobius strip. It is an original and beautifully written story which deserves far more attention than it has received.

Of particular significance was *Hide and Seek* which appeared in the Sept., 1949 ASTOUNDING SCIENCE-FICTION. This short story is built around the problem of a man in a space suit on the Martian moon Phobos who must keep alive and out of sight of an armed space cruiser until help arrives. How he does it is the story. This is known as the "scientific problem" yarn. Put the character into a difficult situation that can only be solved by legitimate scientific reasoning. This approach eventually leads to Clarke's *Fall of Moon Dust*, where the problem of finding a ship in a sea of sand, and of surfacing its occupants, forms a puzzle to build suspense around.

In 1950 Clarke slightly changed direction. He wrote a short book, *Interplanetary Flight, An Introduction To Astronautics*. Despite the fact that it was mildly technical, it sold well enough to warrant distribution in the United States by Harper. This led to the suggestion that he try a longer, more ambitious work. He began research on *The Exploration of Space*.

Prelude to Space, an ambling novel of the preparation for the first trip to the moon written in the summer of 1947, appeared in GALAXY SCIENCE FICTION NOVELS in 1951 and proved unexpectedly popular. The science was good and the motives of the characters involved were effectively portrayed but the book was too close to the present and has already become hopelessly outdated. Another novel, *The Sands of Mars*, published in hardcover by Sidgwick Jackson, London in 1951, was documentary in approach. It tells of a science fiction writer's trip to Mars and his efforts to win the confidence of the pioneers there.

Superiority, a short story published in the Aug., 1951, issue of THE MAGAZINE OF FANTASY AND SCIENCE FICTION, brought Clarke prestige when it was made required reading for certain classes at the Massachusetts Institute of Technology. The

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story had a moral for those scientists who are so determined to strive for increasing sophistication in their work, that they lose out to those aggressively utilizing conventional methods. The very same month, THRILLING WONDER STORIES carried *Earthlight,* the novelet originally written for Gilling's short-lived FANTASY. This story of a power struggle between the planets to gain control of the mineral resources of the moon contains one of the most vivid and thrilling space battles ever to appear in science fiction, not excepting the interstellar extravaganzas of E. E. Smith and John W. Campbell. The story was expanded into a full-length novel and published by Ballantine Books in 1955.

But by far the most important event of 1951 for Clarke was the publication of *The Exploration of Space* by Temple Press Ltd., London. A feature of this book was four full-color paintings by Leslie Carr, derived from drawings by R. A. Smith (who also had some black and white astronomical art in the volume). Harper's distributed the book in the United States where it was submitted to the BOOK-OF-THE-MONTH-CLUB for consideration. Basil Davenport, a science fiction enthusiast and literary critic, was then a reader for the organization. He understood the scope of Clarke's book and highly recommended it to the judges. It happened to be a month when no "important" work appeared, so after some debate the judges decided on a joint selection for the month of July, 1952, one of them to be *The Exploration of Space.*

NEW hero of the science fiction world, Clarke was honored at the May 4, 1952, meeting of the Eastern Science Fiction Association in Newark, N. J., and at The Third Annual Midwestern Science Fiction Conference in Sharonville, Ohio. At those meetings members of the science fiction community attempted to assay the quality that had caused Clarke's book to score so effectively. There had been other books on space travel before, some almost definitive, embodying much greater research and even more fascinatingly written. Clarke's, they finally decided, was the first to define the "reasons why." He presented the case for space travel not only in terms of mechanics and economics but of *philosophy.*

To write *Childhood's End,* Clarke locked himself in a hotel room for two weeks. He used *Guardian Angel* (his own version) as the foundation of the first chapter and then built from there to a Stapledonian finale wherein all mankind unifies into

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a single intelligence and ascends the next step in the ladder of evolution—which is to be sent to a spatial heaven in a mystical parallel to religion. *Childhood's End* (Ballantine Books, 1952), received the major review in THE NEW YORK TIMES for Aug. 27, 1952. Admitting that the ingredients of the novel were inherent in science fiction, the reviewer, William Du Bois, acknowledged: "Mr. Clarke has mixed them with a master hand." He termed the book "a first-rate *tour de force* that is well worth the attention of every thoughtful citizen in this age of anxiety." In conclusion he stated: "The review can only hint at the stimulation Mr. Clarke's novel offers."

Clarke then toured the United States, and spent some time in Florida skin diving. (In 1954 he married an American girl he had known for only a few days, but the marriage ended in separation after a relatively short period.) His interest in skin diving was the common ground that brought him together with Mike Wilson, a crack photographer. They went into a business partnership to do under-water photography along the Great Barrier Reef of Australia and the coast of Ceylon. Mike Wilson married a Singhalese girl and settled down in Colombo. Clarke became a citizen of Ceylon and moved in with the Wilsons'.

Clarke then wrote a number of non-fiction works on skin diving, some in collaboration with Mike Wilson. However, his science fiction novel *The Deep Range* (Harcourt, Brace & Co., New York, 1957), which was dedicated to Mike Wilson, stands out as one of the most absorbing expositions ever done on the future of farming the seas. Impressed by its business potentialities THE WALL STREET JOURNAL reviewed the book in its April 2, 1957 edition.

THE highest honors Clarke received in the science fiction world were won at The 14th World Science Fiction Convention in New York in 1956, where he was Guest of Honor and also was presented with the "Hugo" for the best short science fiction story of the previous year, *The Star* (INFINITY SCIENCE FICTION, Nov., 1955). This story, dealing with the discovery of the remains of the star that went into nova at the time of Christ's birth, poses a moral dilemma which was intended to strike the reader with considerable impact.

A far greater honor was the receipt of the 1962 Kalinga Prize, awarded by UNESCO for the popularization of science. The presentation carries with it

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$2800 in cash; but from the prestige standpoint it placed Clarke in company with such past winners as Julian Huxley, Bertrand Russell and George Gamow. The prize was given in acknowledgement of the fact that Clarke's fiction and non-fiction have resulted in sales of over two million books in 15 languages, as well as more than 300 articles and stories in publications as distinguished as READER'S DIGEST, THE NEW YORK TIMES, HORIZON, HOLIDAY, HARPERS, VOGUE and SATURDAY REVIEW.

Clarke's "failings" as an author were many in the realm of science fiction. For the most part he was not an innovator. As a literary technician he was outclassed by a score of contemporaries. His style, by current standards, was anachronistic. Yet the public of many countries bought and read him with enthusiasm and the hard-headed critics applauded his efforts.

What is the answer to this seeming paradox?

In an age fraught with horror and despair he was optimistic. Mankind, in his stories, was essentially noble and would aspire and triumph despite all difficulties.

At the base of each of his stories was a thought-provoking idea, concept or philosophy. Whether they were original with him is beside the point. They were always present and they read new to this generation.

The ideas were never introduced obliquely nor reviewed in a blase, matter-of-fact manner, as is so often true of most modern science fiction. Instead, he vested his concepts with all the poetry, wonder, awe, mystery, and majesty that he was capable of conjuring. Even if it was only the preparation of the first space rocket, Clarke attempted to communicate the richness and implication of an overwhelming experience.

And his science, though thorough and authentic, was easily followed, adding to the willing suspension of disbelief.

For Arthur C. Clarke, the moment of decision as to what type of science fiction he wanted to write had come at the end of World War II. He chose to go against the trend. For him, a paraphrase of Robert Frost's famous lines certainly applies:

He took the road least traveled by, and that made all the difference.

THE END

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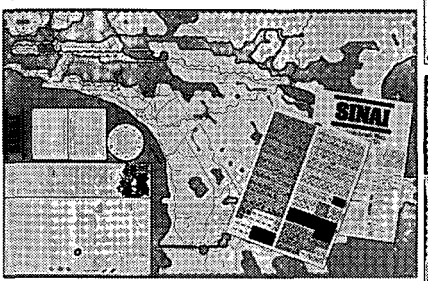

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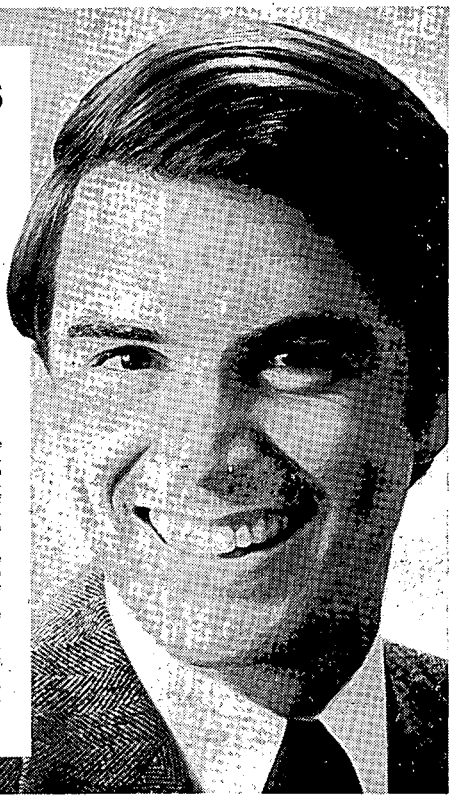

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